THE USE OF CHANGES IN ESTIMATES TO MEET OR BEAT ANALYST FORECASTS

A Dissertation

by

SEAN MCCARTHY

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Chair of Committee,	Edward Swanson
Committee Members,	Sarah Rice
	Dechun Wang
	Thomas Wehrly
Head of Department,	James Benjamin

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ABSTRACT

Managers exercise judgment in valuing a large portion of their balance sheets. As a mandatory requirement of maintaining faithfully presented financial statements, they are required to occasionally record a change in estimate and disclose the current period income effect of revision of the valuation assumptions for these assets and liabilities. Guidance requires managers to recognize these changes when new information is obtained regarding existing valuation assumptions. Given the unobservable and unverifiable nature of many of these assumptions, managers have significant latitude in the timing of such changes. Discretionary use of accrual accounts to manage earnings is well documented in accounting literature; however, the majority of these studies approximate discretion in accruals using models of expected accrual balances. Changes in estimates, however, provide the opportunity to observe the influence of manager valuation judgments without having to model expected balances. I find that firms tend to recognize income increasing changes in estimates advantageously to meet or beat analyst expectations. Additionally, recognition of income decreasing changes in estimates negatively impacts the likelihood to meet or beat. These results are consistent with extant earnings management literature and suggest managers time valuation modifications to beat expectations. I find that this result is robust to the use of a propensity score matched control sample or use of a fixed effect regression comparing a firm quarter to other quarters for the same firm. My results are robust to several changes in proxies, settings, and design choices. This paper contributes to the literature

by showing a potential mechanism of earnings management. More important, this mechanism—changes in estimates—has mandatory footnote disclosure, which permits for analysis of discretionary use of accruals without the limitation of potential measurement error for discretionary accruals.

DEDICATION

I dedicate my dissertation to the ladies in my family, past and present. To Doris and Edna Ruth. To Dawn, Jill, and Jackie. To JoAnne, Linda, and Maggie. To Tanya, Susie, and Amy. To Sandra.

To my mother Susan. To Star. And last, to Jamukha.

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TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

Chapter 1 of the FASB Conceptual Framework states that "to a large extent, financial reports are based on estimates, judgments, and models rather than exact depictions" (FASB Concept Statement No. 8, 2010, Chapter 1, OB11). Genworth Financial, Inc.'s 2013 Annual Report provides a good example of the influence of judgment and estimates. The firm "reduced [its] prior year reserves by $44 million as a result of changes in estimates related to prior year insured events and the development of information and trends not previously known when establishing the reserves in prior periods." Accounting rules require that the $44 million be recorded in the current period as an increase in earnings of approximately seven percent. This disclosure, located deep in the footnotes, exemplifies the innate subjectivity in estimate accounts as well as the potential magnitude of these decisions.

I investigate whether managers manipulate earnings using the flexibility given in accounting guidance for estimates. In the example above, the disclosure suggests the change was attributable to new information not originally known. However, it is difficult as an outside party to verify when information first becomes available and, in turn, if it was used immediately upon discovery. Managers could conceivably incorporate new information into valuation of estimates when it becomes advantageous for them, especially given the limited prominence of these disclosures. If managers can defer recognition of changes in estimate as a sort of off-book cookie jar, they may be

able to recognize these changes when strongly incentivized to increase earnings, such as to meet or beat analyst expectations.

Extensive research indicates that managers use accruals to manage earnings (Jones, 1991; Dechow, Sloan, and Sweeney, 1995; Dechow and Dichev, 2002; Kothari, Leone, and Wasley, 2005; Collins, Pungaliya, and Vijh, 2017; among many others). These papers identify earnings management by separating abnormal accruals, or in other words the accrual component of earnings that cannot be explained, from normal accruals. Delineation between normal accruals and abnormal accruals is limited by our ability to determine normal accruals without measurement error. As emphasized in Collins et al. (2017), significant measurement error often occurs unintentionally due to several design choices.

Several studies provide evidence of accrual-based earnings management using specific accrual accounts. Financial statement line items with thorough disclosures such as the allowance for bad debts (Teoh, Wong, and Rao, 1998), claim loss reserves (Beatty, Ke, and Petroni, 2002; Nelson, 2000), and tax allowances (Dhaliwal, Gleason, and Mills, 2004; Frank and Rego, 2006) have abnormal components which correspond to incentives to manage earnings. These measures, however, suffer from the same limitation of aforementioned discretionary accruals literature. Specifically, it is difficult to disentangle measurement error from the abnormal element in an accrual balance.

Audit literature, on the other hand, tends to take a different approach to researching estimate accounts. One of the few archival audit papers on the topic, Petroni and Beasley (1996) use insurance company claim loss reserves to examine if auditors

influence the accuracy of claim loss estimates. They find that valuation errors for these accounts can be quite large and occur frequently. They show that these errors only vary with respect to Big N auditors for financially constrained firms. In aggregate, their findings suggest auditors have a limited role in improving valuation accuracy on this specific estimate account. Salterio and Koonce (1997) use an experiment to show that auditors tend to concur with their clients' accounting choices when client and external evidence conflict with respect to the accounting treatment for an uncertain item. Mauldin and Wolfe (2014) find that only a minority of their sample participants adequately modified substantive audit procedures in response to managerial bias noted in control testing of an estimate account. Griffith, Hammersley, Kadous, and Young (2015) use a critical thinking intervention to see if deliberate critical thinking improves auditors' ability to notice inconsistencies among assumptions, other internal data, and external conditions. In an effort to understand how auditors gain comfort with estimate accounts, Griffith, Hammersley, and Kadous (2015) interview experienced auditors and specifically investigate "what [auditors] do to audit estimates and how they apply the vague standards" (p. 83). They find that auditors tend to rely (possibly over rely) on management's assumptions and sometimes fail to critically assess the appropriateness of valuation assumptions relative to outside evidence. Behavioral research supports conclusions of empirical testing, and PCAOB auditor inspection reports also confirm

these findings, frequently citing auditor deficiencies in assessing estimate accounts.[1] In summary, audit literature on estimate accounts underlines the innate subjectivity of estimates and the difficulty auditors have in assessing managers' estimates.

Changes in estimates provide a setting to empirically analyze discretionary action of managers. Similar to the aforementioned audit literature, I examine the direct impact of actions taken by managers by investigating whether recognition of changes in estimates influences the likelihood to meet or beat consensus analyst forecasted earnings. Using a logistic regression to compare firm-quarters with changes in estimates to a control sample matched on industry, year, size, and performance, I find that firms recording income increasing changes are more likely to meet or beat expectations. The incremental likelihood to meet or beat, based on the odds ratio, is an increase of 91.8 to 121.4 percent relative to matched firms that did not record changes in estimates.[2] Additionally, I find that firms recording income decreasing changes are less likely to meet expectations. The likelihood of meeting expectations decreases 40.6 to 48.7 percent relative to the matched firms without changes in estimates. These findings are consistent with discretionary accruals research, however the issue of measurement error is significantly mitigated in my analysis due to mandatory disclosure of the income effect of the change. My findings therefore provide a more direct indicator of manager manipulation than extant models.

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[1] Griffith et al. (2015) show that roughly 70 percent of issues identified by the PCAOB during 2008 and 2009 related to fair value, impairment, and estimation; all of these would be considered estimate accounts in the classification for changes in estimate disclosure.

[2] The increases in likelihood disclosed depend on the specification of the expectation threshold. These values are shown in Table 3 later.

In additional analyses, I attempt to investigate the relationship between the strength of the incentive to manage earnings and the magnitude of the change in estimate using a well-known research design used to show how changes in tax expense correspond to the strength of the incentive to manage earnings (Dhaliwal et al., 2004). I find that the magnitude of the change in estimate has a positive relationship with the strength of the incentive, reinforcing the finding that firms use estimate accounts to manage earnings. I also test whether the strength of incentive influences the use of changes in estimates by proxying for additional motivation with the streak of consecutive quarters that have met or beaten expectations. I find that the likelihood of meeting or beating increases with the length of the streak, consistent with prior literature. The use of changes in estimates to meet or beat, however, is not moderated by the length of the streak.

I then supplement the original analysis with two variations using alternative control groups. I find that firms recognizing changes in estimates manage earnings near consensus expectations in a similar manner to firms that have downward restatements of estimate accounts. Using fixed effects model, I find that a firm recognizing an income increasing change in estimate is almost twice as likely to beat expectations relative to itself in other periods, while a firm recognizing an income decreasing change in estimate is almost half as likely to beat expectations relative to itself in other periods.

I also investigate whether recognition of changes in estimates impacts the likelihood of meeting or beating expectations in other periods. I find no evidence that these changes are detrimental or beneficial to contiguous quarters, suggesting managers

are not "borrowing" from other periods, nor are they reaping benefits from changes in estimates in multiple periods. Lastly, I investigate whether results are driven by firms which routinely record changes in estimates. I find that serial changers do not have a different relationship between recognition of changes in estimates and the likelihood to meet or beat expectations relative to their counterparts who record changes in estimates infrequently.

My primary contribution to the literature is identification of a specific discretionary decision that may suggest earnings management. Much of the literature focuses on overall accruals or patterns in specific line items, however we are limited in our ability to predict the discretionary component of these measures. My study uses an accounting disclosure of an inherently discretionary managerial decision to identify potential earnings management, without needing a model of expected balances. Changes in estimates may provide a cautionary signal to investors assessing performance near thresholds.

The remainder of the paper is organized as follows: Chapter II establishes the background for my analysis on changes in estimates and develops my hypothesis based on prior literature. Chapter III discusses sample selection, development of variables, and the research design used to test my hypothesis. Chapter IV presents descriptive statistics and the results from multivariate analyses. Chapter V provides my concluding discussion.

CHAPTER II

LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1 Background on Accounting Estimates

Accounting guidance acknowledges the complexity of valuation for estimate accounts and attempts to provide a foundation for the faithful representation of these accounts. In describing faithful representation, the Conceptual Framework states "an estimate of an unobservable price or value cannot be determined to be accurate or inaccurate. However a representation of that estimate can be faithful if the amount is described clearly and accurately as being an estimate" (Chapter 3, QC15). To maintain a faithful representation, GAAP requires firms to disclose the nature of any change and the current period income effect (FASB ASC 250-10-50). [3] GAAP defines changes as "a necessary consequence of the assessment…of the present status and expected future benefits and obligations associated with assets and liabilities. Changes in accounting estimates result from new information" (ASC 250-10-20). With guidance permitting revisions, and with only footnote disclosure, managers may perceive few negative consequences to using changes in estimates to manage income. Accordingly, a change in estimate may provide an opportunity for discretionary action in accounting valuation.

[3] Current codified guidance for changes in accounting estimates derives from SFAS 154, which was enacted in 2005. This superseded APB 20: Accounting Changes. The definition of a change in estimate, the accounting treatment, and the disclosure requirements are consistent across APB 20, SFAS 154, and ASC 250, therefore alleviating concern that implementation of regulation affects accounting for changes in estimates.

2.2 Meeting or Beating Analyst Expectations

A change in estimate reflects revised valuation of existing assets or liabilities, but managers may advantageously recognize these changes by postponing revision until incentivized. The incentives to revise estimate valuation vary depending on the firm's performance relative to expectations since such revisions impact current period earnings. Much research has shown that various incentives beyond simply increasing income motivate accounting decisions (see Healy and Wahlen, 1999 for an in depth discussion).[4]

Degeorge, Patel, and Zeckhauser (1999) outline the hierarchy of important thresholds for firm earnings, demonstrating that managers appear to influence earnings in order to clear the following benchmarks, in order of importance: 1) zero earnings, 2) prior period earnings, and 3) analyst forecasted earnings. In light of recent findings, specifically those of Gilliam, Heflin, and Paterson (2015), I do not investigate earnings management to avoid reporting losses, since evidence suggests this effect has largely disappeared in the post-SOX era. Earnings relative to prior period earnings pose their own problems, in that managers have control over both earnings and the benchmark, which introduces significant complexity into matching the incentives to actions. The analyst forecast benchmark, on the other hand, provides a setting where managers have only indirect influence on the benchmark.[5]

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[4] Among these incentives are income smoothing, piling losses into an already poor period, and meeting certain thresholds. While I recognize the former two are potentially interesting settings, I focus on the latter in effort to restrict my analysis to a well-researched incentive-based earnings management setting.

[5] An extensive literature shows that managers influence analyst forecasts (Richardson, Teoh, and Wysocki, 2004; Brown and Pinello, 2007; Bradshaw, Lee, and Peterson, 2016), so I would expect to find no indication of earnings management relative to analyst forecasts if managers could perfectly influence analyst forecasts. However, extant literature finds that managers actively manage earnings even when

Extant literature shows several benefits which may emphasize the incentive to meet or beat forecasts. Lopez and Rees (2002) find stronger market responses to earnings for firms that meet benchmarks. Kasznik and McNichols (2002) find beating benchmarks is associated with a short term market premium as well as future profitability. Bartov, Givoly, and Hayn (2002) find excess returns for firms that meet or beat relative to firms of comparable performance that did not clear their benchmarks, and that excess returns exist even when firms appear to have achieved this through earnings management. These benefits incentivize managers who are just short of consensus to exercise influence over earnings to meet their thresholds.

The most robust subset of earnings management literature focuses on the advantageous use of accruals (most notably: Jones, 1991; Dechow, Sloan, and Sweeney, 1995; Dechow and Dichev, 2002; Kothari, Leone, and Wasley, 2005; Collins, Pungaliya, and Vijh, 2017). While the most widely used accruals measures in the earnings management literature aggregate values of all accrual-based earnings, researchers have also documented the use of specific accrual accounts to manage earnings, notably bad debt expense (Teoh et al. 1998), claim loss reserves (Beatty, Ke, and Petroni, 2002; Nelson, 2000), and taxes (Dhaliwal et al., 2004; Frank and Rego, 2006).

The common thread within accruals-based earnings management papers is the use of manager discretion in valuation. Yet changes in estimates, which clearly indicate a revision of manager beliefs regarding asset valuation, have not been investigated.

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they have managed the benchmark (Burgstahler and Eames, 2006). My paper adds to their findings, specifically investigating a mechanism through which firms manage earnings around the analyst forecast.

Given the extent of managerial discretion innate in estimate accounts, it is reasonable to speculate that, consistent with the extant literature on accrual management to meet or beat, firms may use these accounts to beat the analyst benchmark. Therefore I hypothesize:

H1: Firms will recognize changes in estimates advantageously to meet or beat analyst expectations.

CHAPTER III

RESEARCH DESIGN

3.1 Data and Sample Selection

My sample begins with the intersection of Compustat and I/B/E/S data. I require sufficient data on analyst following with earnings guidance. I obtain changes in estimates data from Audit Analytics' Changes in Accounting Estimates database. This database contains the financial statement item (e.g. warranty, asset retirement obligations) and the income statement impact of the change. Since disclosures of changes in estimates occur both in annual and quarterly statements, I use quarterly data for financial information and analyst expectations to align the managerial action with the most applicable analyst consensus-based incentives. I only include observations from 2003 to 2014 since data on changes in estimates is sparse preceding 2003. The cross section of firm-quarter observations within this window is 329,940, of which 2,141 (1,580) have income increasing (decreasing) changes in estimates.

Next I limit the sample to only firm-quarter observations with sufficient data for all control variables[6] as well as the lagged values for size, return on assets, growth, book-to-market ratio, and accruals, which are used for the propensity score match sample selection as outlined below.[7] This restriction limits the sample to 110,843

[6] Specifically, I require data on actual and forecasted earnings from I/B/E/S and outstanding shares, price, operating income, assets, and sales from Compustat.
[7] All variables for my analyses are defined in Appendix A.

observations, of which 1,336 (952) have income increasing (decreasing) changes in estimates.

I further limit my sample to firms where the incentive to meet or beat is likely strongest. Consistent with Dhaliwal et al. (2004), I only include observations whose absolute difference between consensus forecast and actual earnings per share is within five cents per share, resulting in a sample of 65,704 firm-quarter observations.[8] This cutoff is motivated by the distribution of earnings in Brown (2001) that shows a high concentration of firms fall within five cents of consensus. Firms falling within this range are more sensitive to earnings management incentives to meet or beat analyst expectations. My results are qualitatively similar if I use an alternative cut of -$0.04 to $0.03 used by Doyle, Jennings, and Soliman (2013).

Of the 65,704 firm-quarter observations, 656 (390) observations report income increasing (decreasing) changes in estimate. In order to develop a stronger analysis, I propensity score match quarters with income increasing changes in estimates to quarters without a change in estimate. I regress the likelihood of a change in estimate on lagged values for logged market value, return on assets, book-to-market, accruals, and discretionary accruals.[9] I match each observation containing an income increasing change in estimates to the observation with the closest propensity score, conditional on

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[8] Technically, this cutoff is made based on earnings without the change in estimate in order to compare firms that are in similar position prior to recognition of the change in estimate. Results are qualitatively similar if limiting the sample on reported earnings.

[9] In untabulated analyses, I find that the likelihood to recognize a change in estimate is primarily associated with these items. This analysis was generally exploratory in nature as no literature to my knowledge has documented causes of recognition of a change in estimate.

being in the same year and Fama-French 17 industry classification, henceforth referred to as the PSM sample.[10] This process reduces the sample to 2,439 observations, comprised of 1,237 observations with changes in estimate and 1,202 PSM observations.[11]

3.2 Variables of Interest

From the aforementioned Changes in Estimates database, I code three variables that outline specific characteristics of these accounting decisions. First, an indicator variable, *upward_chg,* equal to 1 when a firm reports an income increasing change in estimate in the fiscal quarter and zero otherwise. Secondly, an indicator, *dnward_chg*, equal to 1 when a firm reports an income decreasing change in estimate in the fiscal quarter and zero otherwise. Last, I calculate the per share magnitude of the current period effect of the change (*effect_eps*).[12]

In order to identify meet or beat observations, I use two measures of expectations: the consensus earnings and the most recent analyst forecast. I calculate consensus (*earn_consensus*) using the average earnings forecast from the last forecast from each analyst before fiscal quarter-end. *Last_frcst* is the final analyst forecast for

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[10] Matches are done with replacement, leading to treatment and PSM match samples that are unbalanced. I also impose a caliper of 0.01 with no attrition of treatment firms.

[11] Thirty-five control observations match twice to treatment firms, resulting in an unbalanced sample. This is a result of matching with replacement in order to obtain the best comparison, consistent with the suggestions in Shipman, Swanquist, and Whited (2017).

[12] Firms can report the effect on income as they deem fit, with most firms reporting the effect on pre-tax income, effect on net income, or effect on earnings per share. If firms report the effect on pretax earnings, I use the effective tax rate for that quarter to determine the after-tax effect on income. I then scale this amount by shares outstanding for diluted earnings per share to arrive at the effect on earnings per share. I similarly scale the effect by outstanding shares for firms which report the effect on net income.

earnings prior to fiscal quarter-end. I compare these to actual reported earnings (*earn_report*) from I/B/E/S to determine if a firm met or exceeded expected earnings. Specifically, *meet_beat1* (*meet_beat2*) takes a value of 1 if reported earnings equal or exceed consensus (most recent) analyst expectations and zero otherwise. I label earnings in excess of analyst expectations as *earn_surprise1* (*earn_surprise2*) for reported earnings in excess of consensus (the last forecast). Positive values for *earn_surprise1* (*earn_surprise2*) correspond to a value of one for the *meetbeat1* (*meetbeat2*) indicator. Consistent with Doyle et al. (2013), I use I/B/E/S reported earnings rather than manager-provided pro forma earnings. Managers' pro forma earnings typically adjust for many exclusions that analysts subsequently unwind in their reported earnings (Gu and Chen, 2004). Review of press releases indicates both analyst actual earnings and pro forma and GAAP earnings reflect changes in estimates, permitting analysis of either form of earnings in the context of my research question.

3.3 Analysis Design

To test the hypothesis that firms use changes in estimates advantageously, I compare the propensity to meet or beat analyst forecasted earnings for firms with and without changes in estimates. I include the *upward_chg* indicator to assess the incremental likelihood of meeting or beating analyst expectations. A positive coefficient on *upward_chg* would lead to rejection of the null that firms do not use changes in estimate to meet this specific threshold. The logistic regression is as follows:

$$\Pr(meet\ beat\#) = \beta_0 + \beta_1 upward\ chg_{i,t} + \beta_2 dnward\ chg_{i,t} + \beta_3 book\ to\ mkt_{i,t} + \beta_4 growth_{i,t} + \beta_5 loss_{i,t} + \beta_6 ROA_{i,t} + \beta_7 size_{i,t} + \beta_8 disc\_acc_{i,t} + \beta_9 meet\ beat\#_{i,t-1} + e_{i,t} \quad (1)$$

I perform this analysis with both *meet_beat1* and *meet_beat2* specifications of exceeding expectations, with the respective dependent variables taking a value of one if reported earnings exceed consensus analyst expectations or the last analyst forecast. I include control variables in Model 1 that have been found to be associated with meeting or beating analyst expectations.[13] The book-to-market ratio (*book_to_mkt*) is measured as the book value of equity divided by the market value of equity for the fiscal quarter.[14] *Growth* is calculated as the percent increase of revenues for the quarter compared to the corresponding quarter from the prior year.[15] *Loss*, an indicator variable calculated using the reported earnings (*earn_report*), is 1 when firms record negative earnings for the quarter and zero otherwise. *ROA* is calculated as quarter-to-date income (Compustat *ibq*) divided by total assets (Compustat *atq*). I measure *size* as the natural logarithm of the market value of equity. [16] I also include an indicator if the firm met or exceeded expectations in the preceding quarter to capture a firm's tendency to meet expectations in consecutive quarters and unobservable factors that may cause this.

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[13] In untabulated analyses I also include Tobin's Q as a control, however it is generally insignificant. I therefore omit it from the tabulated results.
[14] Specifically, *book_to_mkt* is calculated using quarterly shareholder equity (Compustat *seqq*) divided by the product of quarter-end price (Compustat *prccq*) and shares outstanding (Compustat *cshoq*).
[15] I use quarter-to-date revenue (Compustat *revtq*) rather than using year-to-date revenue to avoid confounding effects of growth in preceding quarters.
[16] All continuous variables are winsorized at 1 and 99 percent.

In order to investigate whether the influence of changes in estimates on the likelihood of exceeding expectations is incremental to abnormal accruals, I control for quarterly growth and performance adjusted Modified Jones discretionary accruals.[17] I calculate these accruals following Collins et al. (2017), which includes additional terms to address backward-looking sales growth, forward-looking expected growth, and performance. The model used for discretionary accruals is shown in Model 2 below.

$$accruals_{i,t} = \lambda_0 + \lambda_1 Q_{1,i,t} + \lambda_2 Q_{2,i,t} + \lambda_3 Q_{3,i,t} + \lambda_4 Q_{4,i,t} + \lambda_5 (\Delta sales_{i,t} - \Delta AR_{i,t}) + \lambda_6 acc_{i,t-4} + \sum_k \lambda_7 \, ROA \; dum_{k,i,t} + \sum_k \lambda_8 \, SG \; dum_{k,i,t-4 \; to \; t} + \sum_k \lambda_9 \, MTB \; dum_{k,i,t-1 \; to \; t} + \xi_{i,t} \quad (2)$$

The measurement of accruals (*accruals*) follows the Hribar and Collins (2002) approach, which uses information from the cash flow statement.[18] Inclusion of indicators corresponding to the fiscal quarter allows for potential quarter effects on accruals. Changes in sales and accounts receivable are measured as the change in both balances relative to the preceding quarter, consistent with the standard definition of the equivalent term in Modified Jones accruals models. Inclusion of accruals for the same quarter in the prior year ($acc_{i,t-4}$) controls for potential unobservable determinants of accruals for a given quarter in each year. The final series of controls in the Collins et al.

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[17] While I do not directly hypothesize earnings management evidence through changes in estimates incremental to that from discretionary accruals, it is necessary to include discretionary accruals to ensure my findings contribute to what the literature already has established regarding earnings management through accruals. Results are unchanged if I exclude accruals from my analyses.

[18] Specifically, Hribar and Collins (2002) measure accruals as the sum of changes in AR, inventory, AP, taxes payable, and other items, all as reported within the statement of cash flows. Collins et al. (2017) thoroughly discuss the omission of depreciation and amortization from the calculation of accruals. I note that, consistent with their methodology, I omit these expenses and, importantly, also the term within the model capturing changes in fixed assets.

(2017) model contains indicators for ROA, sales growth, and market-to-book quintiles. These indicators take a value of one if the firm-quarter observation is in the corresponding quintile of the distribution for each ratio. For example, a firm-quarter with an ROA in the lowest quintile of the distribution of ROAs for all observations will have an indicator for $ROA\_dum_{1,i,t}$ and a zero for all other ROA dummy variables. The intent of these dummies is to capture the relationship of accruals with each of these measures while not necessarily requiring a linear relationship between the ratios and the balance of accruals.[19] Discretionary accruals (*disc_acc* in my analyses) is calculated as the residual ($\xi_{i,t}$) for each observation in the regression shown in Model 2.

[19] Refer to Collins et al. (2017) for a much more detailed discussion of the motivation and calculation of all variables. Their paper demonstrates how discretionary accruals calculated quarterly using a standard definition of Modified Jones accruals are influenced by the omission of growth and performance measures.

CHAPTER IV

RESULTS

4.1 Descriptive Statistics

Table 1 presents descriptive statistics for the sample of firms used in my analyses. I show observations with changes in estimates separate from the PSM sample. The sample has 2,439 observations from 2003 to 2014, of which 1,237 report income increasing changes in estimates. Differences of means between these two samples are insignificant and very similar between subsamples. Specifically, observations with changes in estimates meet or beat both consensus analyst forecasts (73.1 percent) and the most recent forecast (71.6 percent) at approximately the same rate as the PSM sample (73.1 percent and 70.0 percent, respectively). Prior quarter likelihood to beat expectations is comparable between estimate changes and the PSM sample as well. The subsample with changes in estimates (PSM sample) met consensus earnings in the prior quarter 71.9 percent (72.1 percent) of the time and met the last forecast 70.4 percent (70.0 percent) of the time; neither difference is statistically significant. The amount with which the firms beat consensus, *earn_surprise1* (*earn_surprise2*), provides preliminary evidence of Hypothesis 1, with the mean *earn_surprise1* (*earn_surprise2*) for observations with changes in estimates of $0.013 ($0.013) compared to $0.007 ($0.006) for the PSM sample, t statistics of 4.56 and 4.12, respectively.

Table 1
Descriptive Statistics

	Income increasing changes in estimates				Propensity-matched control observations			
	N	mean		p50	sd	N	mean	p50	sd
meet_beat1	1,237	0.730		1.000	0.444	1,202	0.731	1.000	0.443
meet_beat2	1,237	0.716		1.000	0.451	1,202	0.700	1.000	0.458
meet_beat1_pq	1,237	0.719		1.000	0.449	1,202	0.721	1.000	0.449
meet_beat2_pq	1,237	0.704		1.000	0.457	1,202	0.700	1.000	0.458
upward_chg	1,237	0.530		1.000	0.499	1,202	0.000	0.000	0.000
dnward_chg	1,237	0.315		0.000	0.465	1,202	0.000	0.000	0.000
earn_report	1,237	0.290		0.210	0.391	1,202	0.294	0.220	0.372
earn_consensus	1,237	0.277		0.210	0.379	1,202	0.287	0.210	0.366
last_frcst	1,235	0.274		0.210	0.411	1,201	-0.736	0.210	35.331
earn_surprise1	1,237	0.013	***	0.010	0.039	1,202	0.007	0.010	0.024
earn_surprise2	1,235	0.013	***	0.010	0.053	1,201	0.006	0.010	0.038
effect_eps	1,237	0.009		0.001	0.034	1,202	-	-	-
disc_acc	1,237	-0.001		0.000	0.025	1,202	-0.001	-0.001	0.025
book_to_mkt	1,237	1.282		0.930	1.294	1,202	1.200	0.836	1.260
growth	1,237	0.115		0.065	0.314	1,202	0.115	0.079	0.291
loss	1,237	0.171		0.000	0.377	1,202	0.149	0.000	0.356
roa	1,237	0.003		0.010	0.039	1,202	0.005	0.011	0.040
size	1,237	7.153		7.067	1.699	1,202	7.209	7.106	1.760

This table presents univariate summary statistics for key variables for observations with changes in estimates and the propensity score matched (PSM) control observations. PSM observations are matched with replacement, leading to a smaller sample size for the PSM group. All observations are from 2003 to 2014 and report earnings per share within $0.05 of consensus earnings, absent the effect of a change in estimate. Variables are defined in Appendix A. *Meet_beat1* is 1 for firms that report earnings greater than consensus, 0 otherwise. *Meet_beat2* is 1 for firms that report earnings greater than the final analyst forecast, 0 otherwise *Meet_beat1_pq* and *meet_beat2_pq* are indicators for the preceding quarter meet or beat. *Upward_chg* is 1 if firms disclose an income increasing change in estimate, 0 otherwise. *Earn_report*, *earn_consensus*, *earn_surprise1*, and *earn_surprise2* are earnings per share as reported, mean analyst earnings forecast, earnings in excess of consensus, and earnings in excess of the final forecast, respectively. *Effect_eps* is the per share earnings effect of the change in estimate. *Disc_acc* is growth adjusted quarterly discretionary accruals following the Collins et al. (2017) methodology. *Book_to_mkt* is the ratio of book value of equity to market value of equity. *Growth* is the quarter-to-prior-year-quarter growth in revenues. *Profit* is 1 if firms reported positive earnings, 0 otherwise. *ROA* is earnings scaled by assets. *Size* is the logged market value of equity. All p-values in this table are two-sided. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Observations have similar summary statistics for book-to-market, return on assets, growth, size, and discretionary accruals, which is expected since the PSM sample was matched on these characteristics. As a result of this match process, the samples are comparable in the proportion with negative income (*loss*).

Table 2 shows the pairwise correlations for all variables in the main analyses. I find a positive and significant correlation between income increasing changes in estimates (*upward_chg*) and meeting or beating analyst expectations (both *meet_beat1* and *meet_beat2*). I also find a negative and significant correlation between income decreasing changes in estimates (*dnward_chg*) and meeting expectations (both *meet_beat1* and *meet_beat2*). These univariate comparisons provide preliminary evidence that is consistent with the hypothesis. Income increasing changes in estimates (*upward_chg*) is also positively correlated with both earning surprise measures (*earn_surprise1* and *earn_surprise2*) while income decreasing changes in estimates (*dnward_chg*) has a negative correlation with both of these measures, suggesting the magnitude of the earnings surprise may relate to recognition of changes in estimates. This is further reinforced by positive correlations between the magnitude of the change in estimate (*effect_eps*) and both *earn_surprise1* and *earn_surprise2*.

Table 2
Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 *meet_beat1*	1.000																
2 *meet_beat2*	**0.627**	1.000															
3 *meet_beat1_pq*	**0.167**	**0.125**	1.000														
4 *meet_beat2_pq*	**0.155**	**0.145**	**0.719**	1.000													
5 *upward_chg*	**0.164**	**0.143**	**0.052**	0.039	1.000												
6 *dnward_chg*	**-0.161**	**-0.131**	**-0.047**	-0.034	**-0.265**	1.000											
7 *earn_report*	**0.142**	**0.082**	**0.134**	**0.128**	**0.067**	**-0.090**	1.000										
8 *earn_consensus*	**0.082**	0.033	**0.126**	**0.121**	0.036	**-0.067**	**0.995**	1.000									
9 *earn_surprise1*	**0.702**	**0.560**	**0.127**	**0.120**	**0.336**	**-0.240**	**0.230**	**0.141**	1.000								
10 *earn_surprise2*	**0.484**	**0.663**	**0.092**	**0.113**	**0.267**	**-0.179**	**0.134**	**0.066**	**0.737**	1.000							
11 *effect_eps*	**0.265**	**0.238**	**0.070**	**0.070**	**0.599**	**-0.432**	**0.224**	**0.164**	**0.631**	**0.508**	1.000						
12 *disc_acc*	-0.005	0.025	-0.017	-0.017	0.029	**-0.040**	-0.019	-0.020	-0.007	**0.046**	0.033	1.000					
13 *book-to-mkt*	**-0.066**	**-0.053**	**-0.126**	**-0.108**	0.037	-0.005	-0.024	-0.023	-0.020	-0.009	0.031	-0.002	1.000				
14 *growth*	0.039	0.039	**0.054**	**0.051**	-0.019	-0.012	-0.010	-0.016	0.039	0.030	0.015	0.004	**-0.097**	1.000			
15 *loss*	**-0.203**	**-0.160**	**-0.174**	**-0.168**	-0.028	**0.075**	**-0.518**	**-0.511**	**-0.180**	**-0.104**	**-0.104**	-0.033	**0.058**	**-0.051**	1.000		
16 *roa*	**0.151**	**0.120**	**0.178**	**0.162**	**0.054**	**-0.061**	**0.442**	**0.438**	**0.141**	**0.101**	**0.093**	**0.046**	**-0.103**	**0.051**	**-0.594**	1.000	
17 *size*	**0.116**	**0.067**	**0.148**	**0.122**	0.040	**-0.062**	**0.568**	**0.569**	**0.118**	**0.060**	**0.090**	-0.002	**-0.112**	-0.011	**-0.356**	**0.344**	1.000

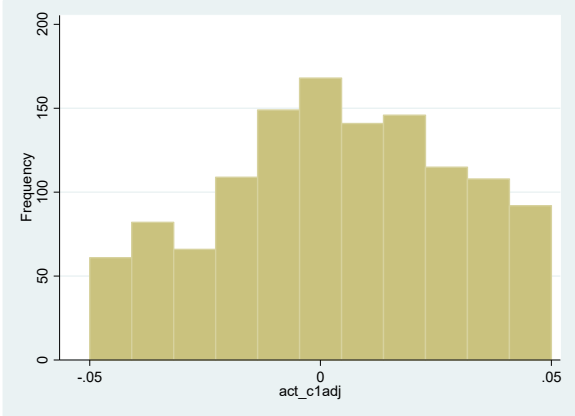
This table shows the pairwise correlations for relevant variables. Correlations that are significant at the 5% level are in **bold print**.

To exhibit the effect of changes in estimate on earnings, I show the distribution of reported earnings for the sample in the panels of Figure 1. Panel A shows the distribution of earnings without the effect of changes in estimates for the observations with income increasing changes in estimates. I center earnings amounts on the corresponding analyst consensus.[20] As a product of the sample definition, the distribution is restricted to earnings within $0.05 per share of consensus. The distribution shows no stark kink in the distribution at the consensus earnings threshold. The peak of the distribution occurs at $0.00, right at the threshold of consensus earnings, and the tails appear fairly symmetrical. Panel B shows the distribution of earnings centered on consensus expectations for the PSM sample.[21] Consistent with Panel A, the sample is restricted to observations within $0.05 of consensus expectations by definition. As expected, the distribution shows a stark kink just below the consensus earnings threshold and a peak at the threshold for these observations, consistent with findings of other research on meeting consensus earnings (Degeorge et al., 1999).

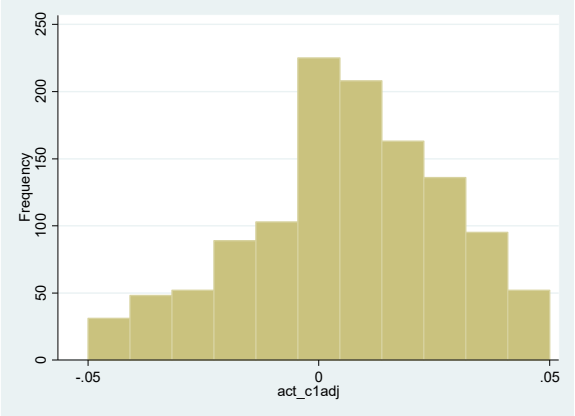
[20] The specific variable used for this panel is *act_cadj*, which is calculated as actual earnings centered on consensus expectations, adjusted for the change in estimate.
[21] Consistent with Panel A, the variable used for the distribution is *act_cadj*. This is equivalent, however, to *earn_surprise1* (actual reported earnings centered on consensus expectations) since the observations in this subset of the sample by definition have no changes in estimates.

Figure 1
Distribution of Earnings Around Consensus Analyst Expectation

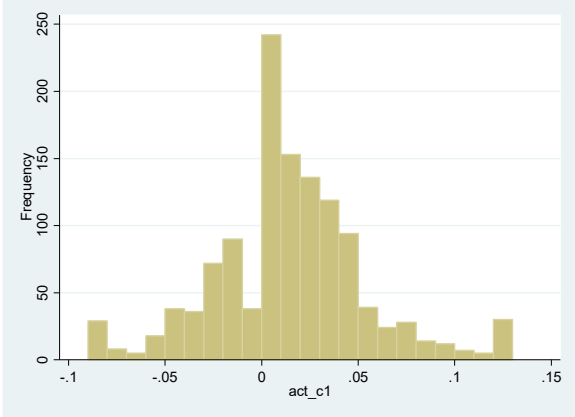
Panel A: Earnings Without Changes in Estimates



Panel B: Reported Earnings for the PSM Sample



Panel C: Reported Earnings for the Changes in Estimates Sample



The panels of this figure show earnings centered on the respective consensus analyst forecasts. Panel A shows the distribution of earnings absent the change in estimate for all observations in the sample with income increasing changes in estimates. Reported earnings are adjusted to back out the effect of the change in estimate. Panel B (Panel C) shows reported earnings for the propensity score matched control sample (observations with income increasing changes in estimates). Panel B shows a kink in the distribution of firms at zero. Specifically, we see far fewer firms $0.01 below expecations that would be expected absent earnings management, consistent with much of the literature. Panel C shows the same pattern for the firms with changes in estimates. Panel A, however, shows earnings for these firms absent the changes in estimates and evidences that the distribution no longer exhibits the kinked nature seen in the other panels.

Panel C shows the comparable distribution of earnings centered on consensus expectations for the subsample with income increasing changes in estimates. The first item of note is that the distribution expands beyond $0.05 of consensus, showing that the impact of the changes in estimates has a material effect on earnings. Secondly and perhaps more important, the kink in the distribution seen for the control sample is mirrored in this subsample. When comparing to the distribution for earnings adjusted for the change in estimate (Panel A), this suggests firms that would fall just below their consensus expectations appear to move up in the distribution. In fact, the bar height for a penny below expectations is shorter than either neighboring bar and the peak occurs at the consensus with bars corresponding to $0.01 and $0.02 much higher than expected absent earnings management. These charts pictorially demonstrate how earnings management may occur through the use of changes in estimates.

4.2 Meet or Beat Through Changes in Estimates

Table 3 presents the multivariate logistic regressions predicting likelihood to meet or beat (*meet_beat1* and *meet_beat2* in Panels A and B, respectively) as a function of changes in estimate (*upward_chg* and *dnward_chg*) and other controls typically found to have an association with likelihood to meet or beat. As predicted in Hypothesis 1, panel A shows the coefficient on *upward_chg* is significantly positive (Z-stat=6.10) and the coefficient on *dnward_chg* is significantly negative (Z-stat=5.31), suggesting that firm-quarters with income increasing (decreasing) changes in estimates are more (less) likely to meet or beat analyst consensus forecast. The odds ratio suggests that the likelihood of beating analyst expectations increases 121.4 percent when an income

increasing change in estimate is recognized and decreases 48.7 percent when recognizing an income decreasing change in estimate, holding all else constant. In this model, statistically significant control variables have the predicted association with the likelihood to meet or beat. Panel B reinforces the conclusion drawn from panel A, with a significantly positive (negative) coefficient on *upward_chg* (*dnward_chg*) when predicting the likelihood of meeting or beating the most recent analyst forecast (Z-stat=5.42 and Z-stat=4.23 for *upward_chg* and *dnward_chg*, respectively). The odds ratios imply that the likelihood of beating the most recent analyst forecast increases (decreases) 91.8 percent (40.6 percent) when a firm recognizes an income increasing (decreasing) change in estimate. In untabulated analyses, I replace the indicators *upward_chg* and *dnward_chg* with the magnitude of the change in estimate (*effect_eps*) and results are unchanged, further reinforcing the relationship between recognized changes in estimate and the likelihood to meet or beat expectations.

Table 3
Logistic Regression of Meet or Beat on Changes in Estimates

Panel A: Consensus Forecast and Change in Estimate Indicator

Variable	Pred Sign	Coef.	Std. Err.	z	Two-tail	P>z
upward_chg	+	0.795	0.130	6.10	0.000	0.000
dnward_chg	-	-0.667	0.126	-5.31	0.000	0.000
book_to_mkt	-	-0.024	0.039	-0.62	0.533	0.267
growth	+	0.262	0.161	1.63	0.102	0.051
loss	-	-0.893	0.156	-5.72	0.000	0.000
roa	+	0.982	1.499	0.65	0.513	0.257
size	+	0.069	0.033	2.11	0.035	0.018
disc_acc	+	-1.447	1.946	-0.74	0.457	0.229
meet_beat1_pq	+	0.571	0.106	5.40	0.000	0.000
Fama-French-17 FE		YES				
Year Fixed Effects		YES				
Observations		2,439				
Psuedo R^2		0.101				
Area Under ROC		0.714				

Panel B: Last Forecast and Change in Estimate Indicator

Variable	Pred Sign	Coef.	Std. Err.	z	Two-tail	P>z
upward_chg	+	0.651	0.120	5.42	0.000	0.000
dnward_chg	-	-0.520	0.123	-4.23	0.000	0.000
book_to_mkt	-	-0.036	0.038	-0.95	0.340	0.170
growth	+	0.285	0.156	1.83	0.068	0.034
loss	-	-0.709	0.153	-4.63	0.000	0.000
roa	+	0.676	1.470	0.46	0.646	0.323
size	+	0.015	0.031	0.49	0.626	0.313
disc_acc	+	1.565	1.873	0.84	0.403	0.202
meet_beat2_pq	+	0.513	0.101	5.1	0.000	0.000
Fama-French-17 FE		YES				
Year Fixed Effects		YES				
Observations		2,439				
Psuedo R^2		0.070				
Area Under ROC		0.675				

This table reports the logistic regression results for Model 1. All variables are defined in Appendix A. Reported p-values are one tailed. The sample includes all firm-quarter observations with sufficient data from 2003 to 2014 that report income increasing changes in estimates and the propensity score matched sample of control firms. Panels A and B (Panels C and D) report the regression results predicting the likelihood of meeting or beating expectations using the indicator for an income increasing change in estimate (the magnitude of the change in estimate). Panels A and C (Panels B and D) define expectations using the consensus forecast (last analyst forecast).

4.3 Additional Analyses

The following sections discuss a series of additional analyses to further explore the robustness of the relationship between meeting or beating and changes in estimates. I first investigate whether the size of the recognized change in estimate has an association with the incentive to manage earnings. The next two sections test the relationship between likelihood to meet or beat and changes in estimates with alternative control samples. I then look to see if these changes influence other periods and if I can isolate firms that are likely managing earnings from those that may be recording these changes through proper accounting. Then I separate firms into those that routinely or infrequently report changes in estimates to investigate if they use changes in estimates differently for beating expectations. Lastly I investigate whether firms with increased incentives due to a streak of beating expectations use changes in estimates differently.

4.3.1 Magnitude of Changes in Estimates

The results reported in Table 3 show that recognition of changes in estimates influences the likelihood of meeting or beating expectations. Next, I consider the relationship between influence and the magnitude of the change. I adopt the research design from Dhaliwal et al. (2004), who show earnings management through tax accounts by modeling changes in tax rates as a function of the strength in the incentive to meet or beat. They proxy for the incentive to manage earnings with the distance from the consensus using outdated previous estimate of effective tax rate and include an

indicator equal to 1 if the firm would have missed consensus with this tax rate.[22] The dependent variable is the reduction in effective taxes from the outdated rate, with the coefficient on the interaction showing the incremental reduction attributable to potentially missing consensus.

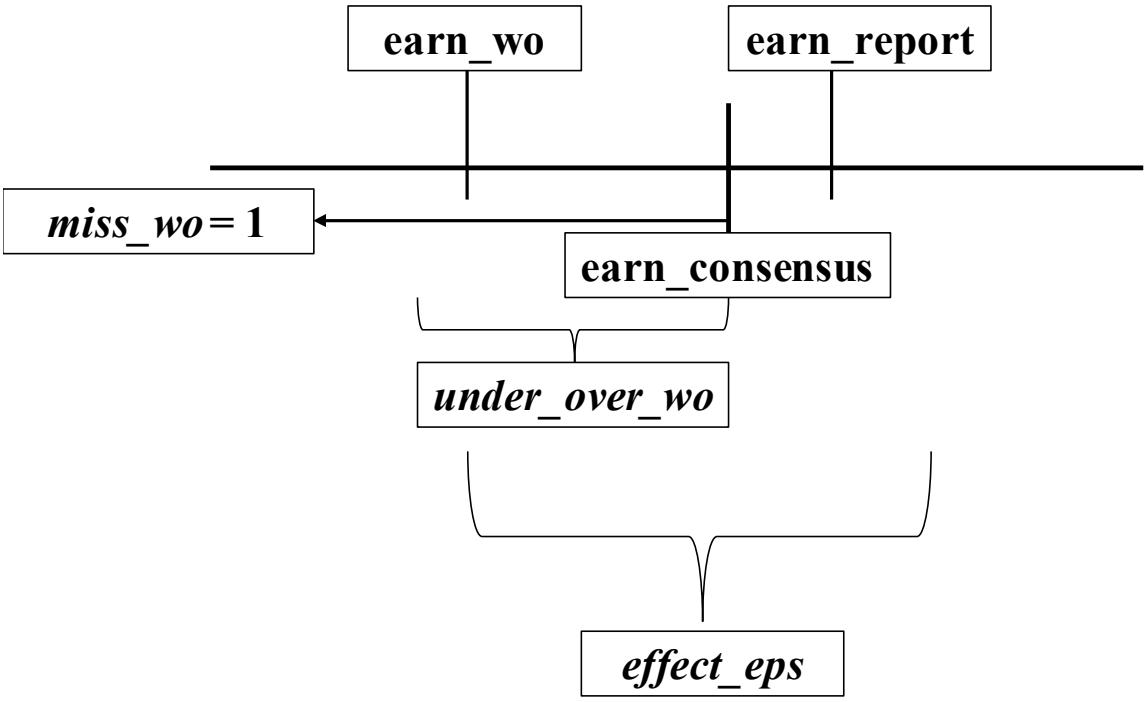
My analysis parallels theirs in showing how the magnitude of a change in estimate varies with respect to the amount with which the firm would miss their consensus earnings. Figure 2 demonstrates the calculation of relevant variables for this analysis. I define my dependent variable, *effect_eps*, as the per-share earnings effect of the change in estimate, consistent with earlier specifications of the magnitude of the effect. The proxy for the incentive to manage earnings, *under_over_wo*, is calculated as the difference between consensus earnings (*earn_consensus*) and what earnings would have been absent the change in estimate.[23] I include an indicator (*miss_wo*) for observations that would have missed the expected earnings without recognition of the change in estimate. In Model 3 below, the coefficient on *miss_wo*under_over_wo* represents the incremental effect of the incentive to manage earnings for firms that would fall under their consensus forecast without the change in estimate.

$$effect\_eps_{i,t} = \beta_0 + \beta_1 miss\ wo_{i,t} + \beta_2 under\ over\ wo_{i,t} + \beta_3 miss\ wo_{i,t} * under\ over\ wo_{i,t} + e_{i,t} \quad (3)$$

[22] Dhaliwal et al. (2004) state "to measure incentives to manage earnings, we assert that a firm has such an incentive if it would have missed its earnings target based on unmanaged earnings (earnings absent tax expense management)."

[23] The actual calculation for *under_over_wo* is *earn_consensus* – (*earn_report* – *effect_eps*). Positive (negative) values for *under_over_wo* represent the amount a firm falls under (over) its consensus earnings.

Figure 2
Calculation of Variables for the Analysis of the Relationship between Incentive and Estimate Magnitude



This figure outlines the calculation of the variables of interest for the analysis of the relationship between the incentive to manage earnings and the magnitude of the change in estimate recorded. Variables used in the analysis are in *italics*. *Effect_eps* is the per-share magnitude of the change in estimate. This amount is used to reduce reported earnings, (earn_report) to an adjusted earnings per share (earn_wo). The distance from the adjusted earnings to the consensus (earn_consensus) is *under_over_wo*. A positive value for *under_over_wo*, let's say $0.03 for example, suggests a firm would have missed its consensus by $0.03 without the change in estimate. *Miss_wo* is an indicator that takes the value of 1 for all positive values of *under_over_wo*. and zero otherwise.

I expect a positive relationship between *effect_eps* and how far under the consensus a firm would be without the change in estimate (*miss_wo*under_over_wo*).[24] I expect the main effect of *miss_wo* to be positive as well, which indicates that firms failing to meet consensus record changes that are larger than those above their consensus, with this difference not corresponding to the distance from the consensus. Table 4 Panel A shows the results of these analyses.[25]

[24] This prediction initially seems contrary to Dhaliwal et al. (2004), who predict a negative relationship between tax rate changes and the incentive to manage earnings. The key difference is that earnings management manifests itself through a reduction in taxes in their analysis but through an increase in the magnitude of a change in estimate in my analysis. While the coefficients work in opposite directions, both predict an increase in earnings management as the incentive to manage earnings increases.

[25] I do not have an expectation for the main effect of *under_over_wo* since this is the relationship between incentive to manage earnings and the magnitude of the change in estimate for firms which beat consensus absent the change in estimate. It is unclear how a surplus beyond the consensus would influence the incentive to increase earnings in this limited setting. My interpretation is contrary to the interpretation in Dhaliwal et al. (2004), however the coefficient in their setting is insignificant.

Table 4
Influence of Incentive to Manage Earnings on the Magnitude of Estimate Changes

Panel A: Regression

Variable	Pred. sign	Coef.	Std. Err.	t	P>t
miss_wo	+	-0.001	0.004	-0.20	0.420
under_over_wo	?	0.173	0.071	2.44	0.015
*miss_wo*under_over_wo*	+	0.197	0.129	1.52	0.064
Year Fixed Effects		YES			
Adjust R^2		0.043			
Observations		1237			

Panel B: Subsample means

Subset	*effect_eps*	*under_over_wo*
miss_wo=1	0.010	0.026
earn_report < earn_consensus	-0.002	0.027
earn_report ≥ earn_consensus	0.048	0.023
t-statistic	29.155 ***	3.074 ***

These analyses are performed all firm-quarter observations from 2003 to 2014 within $0.05 of consensus which recognize an income increasing change in estimates. P-values in this table are one-sided. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A shows the regression of per-share magnitude of income increasing changes in estimates (*effect_eps*) on the spread between pre-change in estimate earnings and the consensus forecast (*under_over_wo*). *Miss_wo* is an indicator equal to 1 when the firm would have missed consensus without the change in estimate. *Under_over_wo* is the per share distance between earnings absent the change in estimate and the consensus forecast. This variable is positive for firms that would have missed consensus (under consensus) and negative for firms that exceed the consensus (over consensus). The coefficient on *miss_wo*under_over_wo* indicates the incremental association between the incentive to manage earnings and the magnitude of the change in estimate for firms that would have fallen under their consensus earnings without the change in estimate.

Panel B shows the mean values for the effect of the change in estimate (*effect_eps*) and the under-/over-consensus amount for earnings without the change in estimate (*under_over_wo*). All observations that would have missed consensus are shown in the first row. The second (third) row shows the subset of these observations that reported earnings that missed (met or beat) consensus. The t-statistic for the difference between these subsets is reported in the final row.

Panel A shows a positive relation (coefficient=0.197, p-value=0.064) between the magnitude of the change in estimate (*effect_eps*) and the incentive to manage earnings (*miss_wo*under_over_wo*). This suggests that firms that would have fallen under their consensus without the change in estimate increase the magnitude of the change corresponding to the magnitude of the shortfall. *Miss_wo* is insignificant suggesting, ceteris paribus, that firms that would fall under their consensus absent the change record a change in estimate that, on average, is no larger than those that beat consensus without the change.

These results suggest managers change estimate accounts in response to incentives to meet or beat; however, they do not address the extent to which earnings management through changes in estimates is successful. Panel B shows the association between the magnitude of the change in estimate and the outcome of actually meeting and beating consensus. In this specific analysis I examine only observations that would have missed their benchmark absent the change in estimate (observations that have a "1" for *miss_wo*). These firms record changes with a per-share earnings effect of $0.01, on average, but are $0.026 under consensus without the estimate revision. This immediately indicates that some of these firms are unsuccessful in meeting expectations. The subset of these observations reporting earnings that meet or exceed consensus (*earn_report* ≥ *earn_consensus*) has significantly larger changes in estimates than those that do not beat expectations (*earn_report* < *earn_consensus*), with mean per-share

changes in earnings of $0.048 and -$0.002, respectively.[26] This suggests that the managers that were successful in meeting expectations did so using significantly larger changes in estimates, which would not be expected if the magnitude of changes in estimates was unrelated to earnings management. I further assess how these firms differ prior to recording the change in estimate by showing the difference in earnings absent the change in estimate (*under_over_wo*), finding that firms that failed to exceed expected earnings were $0.027 under consensus, which is lower than the $0.023 under consensus for those that reported earnings in excess of consensus. The difference between these groups is significant (p-value=0.000). These results further support that managers attempting to meet or beat using changes in estimates do so effectively.[27]

These results should be interpreted within the context of the research design. Specifically, the relationship observed is based strictly on firms that record a change in estimate. While the analysis in Table 3 suggests managers revise estimates to meet or beat expectations, the analyses in Table 4 only model the relationship between incentives to manage earnings and the magnitude of the change, conditional on recognition of a change.

4.3.2 Changing or Restating Estimate Accounts

The next analysis aims to compare changes in estimates to a group of observations presumed to manage earnings. By replacing the comparison group with

[26] Result robust to a difference in medians as well.
[27] The results in Panel A and Panel B are consistent with the exclusion of income decreasing changes in estimates.

observations that manage earnings, the coefficient of interest in this specification indicates meet or beat likelihood that is different from earnings managing observations. An insignificant coefficient on *upward_chg* would indicate that observations with income increasing changes in estimates are equally as likely to beat expectations as the earnings managing observations. I identify earnings managing observations by isolating quarters that are subsequently restated.

Donelson, McInnis, and Mergenthaler (2013) use restatements to document earnings manipulation around analyst expectations. They document a discontinuity in the distribution of earnings as originally reported just below expected earnings for a sample of firms with securities class action suits. This discontinuity, however, disappears when observing the distribution of restated earnings relative to the original analyst expectations. The authors suggest this shows evidence of "managed earnings" which subsequently correct as a result of securities class action suits and restatements. Using a different sample, it is an open question whether the distribution of earnings as originally reported for firms which restate estimate accounts would behave similarly. A comparison between restated estimate accounts and those changed in the period would then show whether firms are performing earnings management outside of or within GAAP.

In order to perform any comparison between changes in estimates and restatements of estimates, I must isolate restatements of estimate accounts. In order to identify restatements for estimate accounts, I extract all line item descriptions of both changes in estimates and restatements from Audit Analytics and include only the

restatements which have similar descriptions to changes in estimates. For example, the Changes in Estimates database contains a line item for "capitalization of expenditures – prepaid assets, other assets, etc." and the restatement database has a similar "capitalization of expenditures issues" category. I exclude restatements that do not relate to estimate accounts (e.g. cash flow statement (SFAS 95) classification errors) and restatements due clerical error since the design of this analysis assumes manager discretion of accounting for these accounts, and clerical error adds noise to this assumption. Appendix C provides more detail on the process of identifying estimate restatements.

Upon defining a sample of firm-quarter observations containing either a change in estimate or a restatement of an estimate account, I further limit the sample to only changes in estimates and restatements that improve earnings in the current period. Specifically, this includes income increasing changes in estimates and restatements that subsequently reduce earnings. The intuition behind the income increasing changes in estimates, as discussed earlier, is that managers recognize a change in estimate to improve earnings to satisfy expectations. Restatements, on the other hand, represent a delay in recognition of a downward change in estimate which permits the firm to meet or beat expectations. I then limit the sample to firms which are within \$0.05 of consensus absent the effect of the change in estimate or with restated earnings, consistent with the primary analyses.[28] The final sample of observations for this analysis contains 2,221

[28] In order to calculate this cutoff, I first calculate the current period effect of the estimate (*est_adj*). For changes in estimates (*upward_chg* = 1), this is the effect of the change, as disclosed in the financial

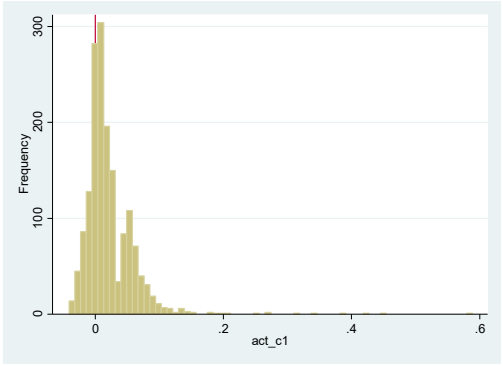
observations, of which 578 have income increasing changes in estimates and the remainder have downward restatements.[29]

statements. For restated observations, (*upward_chg* = 0), this is the difference between earnings as first reported and restated earnings. I then subtract *est_adj* from reported earnings (*earn_report*) to arrive at what I call true earnings (*true_earn*). I require observations to be within $0.05 of consensus earnings using true earnings.

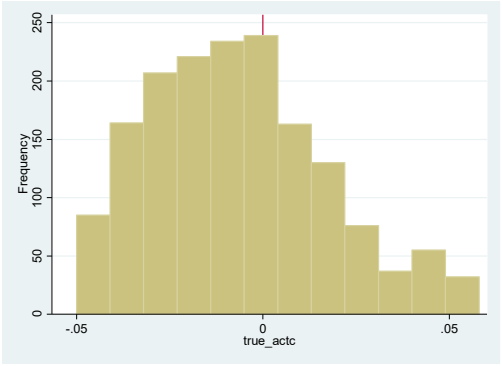
[29] The number of observations with income increasing changes in estimates here differs from that in the primary analysis due to exclusion of observations with both changes in estimates and a restatement of estimate accounts. While this subset of firms is potentially interesting, it adds unnecessary complexity. I therefore exclude these observations for the purpose of this analysis.

Figure 3
Distribution of Earnings around Consensus Analyst Expectation for Estimate Changes and Restatements

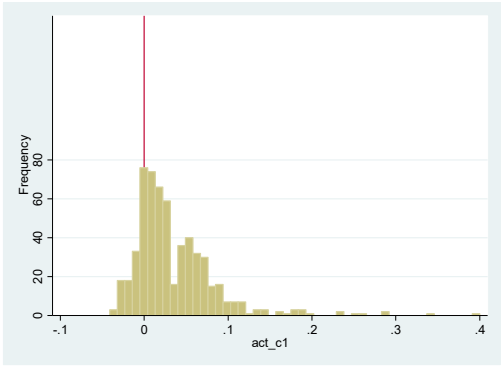
Panel A: Reported Earnings Surprise for Restated Observations



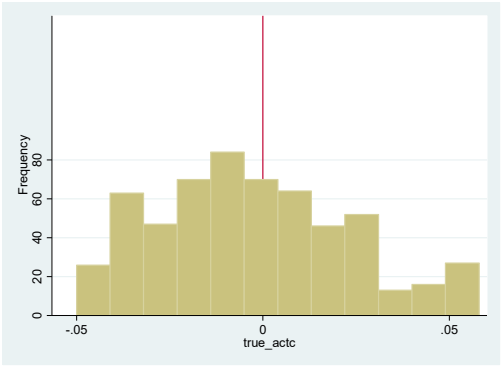
Panel B: Earnings Surprise Adjusted for Effect of Restatement



Panel C: Reported Earnings Surprise for Estimate Changers



Panel D: Earnings Surprise Without the Change in Estimate



The panels of this figure show earnings centered on the respective consensus analyst forecasts for observations which increase income either through incorrect accounting (Panel A and Panel B) that is subsequently restated or through changes in estimates (Panel C and Panel D). Panel A and Panel C show the reported earnings for these firms, both of which show peaks above consensus analyst forecast. Panel B shows restated earnings relative to consensus forecasts, and demonstrates a leftward shift in this distribution as well. Panel D backs out the effect of the change in estimate, which moves the peak of the distribution below the consensus. In aggregate, these histrograms show the similarity in firms which change estimates and those which incorrectly account for estimate accounts and subsequently restate their financial statements.

Table 5
Likelihood to Meet or Beat – Changes in Estimates Versus Restatements

Panel A: Descriptive Statistics

	Income increasing changes in estimates					Downward Estimate Restatements			
Variable	N	mean		p50	sd	N	mean	p50	sd
meet_beat1	578	0.875	**	1.000	0.331	1643	0.834	1.000	0.372
upward_chg	578	1.000		1.000	0.000	1643	0.000	0.000	0.000
earn_report	578	0.357	***	0.270	0.409	1643	0.246	0.180	0.304
earn_consensus	578	0.323	***	0.240	0.399	1643	0.223	0.150	0.295
true_earn	578	0.320	***	0.235	0.400	1643	0.216	0.140	0.297
true_meetbeat	578	0.478	**	0.000	0.500	1643	0.422	0.000	0.494
est_adj	578	0.038	***	0.020	0.039	1643	0.029	0.020	0.028

Panel B: Likelihood to Meet or Beat for Changes in Estimates Relative to Restatements

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	?	0.226	0.161	1.40	0.161
book_to_mkt	-	0.023	0.032	0.70	0.485
growth	+	0.239	0.105	2.26	0.024
profit	+	0.571	0.153	3.74	0.000
roa	+	-0.296	0.208	-1.42	0.155
size	+	-0.034	0.038	-0.91	0.363
2-digit SIC Fixed Effects		YES			
Year Fixed Effects		YES			
Observations		2,221			
Psuedo R^2		0.071			
Area Under ROC		0.674			

Panel C: Likelihood to Meet or Beat with True Earnings for Changes in Estimates Relative to Restatements

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	?	0.100	0.112	0.89	0.371
book_to_mkt	-	0.037	0.021	1.75	0.081
growth	+	0.004	0.059	0.08	0.940
profit	+	0.344	0.117	2.95	0.003
roa	+	-0.220	0.114	-1.93	0.054
size	+	0.001	0.027	0.03	0.977
2-digit SIC Fixed Effects		YES			
Year Fixed Effects		YES			
Observations		2,221			
Psuedo R^2		0.042			
Area Under ROC		0.627			

This table shows the analyses of the relationship between accounting treatment for estimates and the likelihood to meet or beat, comparing firms with changes in estimates to firms that later restate estimate accounts. All variables are defined in Appendix A. Panel A provides descriptive statistics for relevant variables. Panel B and Panel C predict the likelihood to meet or beat consensus forecasts with the effect of accounting treatment of estimates and without the effect of accounting treatment, respectively. The coefficient on upward_chg should indicate if firms that record changes in estimates manage earnings more or less than firms that later restate estimate accounts. All tests of significance are two-tailed.

Figure 3 shows histograms of earnings relative to consensus forecast. Panel A and Panel B demonstrate how a leftward shift in the peak of the distribution occurs when revising earnings from as first reported (Panel A) to restated (Panel B), consistent with the findings of Donelson et al. (2013). Panel C shows the analogue to Panel A for firms with income increasing changes in estimates. Panel D then shows the distribution of earnings relative to consensus forecast absent the effect of the change in estimate. The leftward shift from Panel C to Panel D mirrors that of the restated observations. This provides preliminary evidence which suggests firms may use changes in estimates to manage earnings, much like those that subsequently restate.[30]

Panel A of Table 5 presents descriptive statistics for the sample of quarters with income increasing changes in estimates and quarters which are later restated downward. Both subsets have a high likelihood of meeting or beating, partially due to the sample parameters. The firms that recognize changes in estimates are slightly more likely to meet or beat consensus with 87.5 percent of the observations exceeding expectations compared to 83.4 percent for firms that restate downward. By construction, *upward_chg* is 1 for all observations with a change in estimate and 0 for all observations that later restate. Both reported earnings ($0.36 per share) and expected earnings ($0.32 per share) are significantly higher for the change in estimate subset compared to $0.25 per

[30] It is important to note that while I refer to restated earnings and earnings less the effect of the change in estimate as *true_earn*, I do so out of convenience and not to suggest that all of these firms are managing earnings. Given the proximity of the earnings threshold and the robustness of literature supporting the earnings management conclusion to meet expectations, I generally refer to this phenomena as I believe it occurs on average.

share and $0.22 per share, respectively for restated quarters.[31] *True_earn* is higher on average for quarters with changes in estimates, however the portion of firms that meet consensus expectations drops significantly for both (47.8 percent for changes in estimates and 42.2 percent for restated observations). The income effect of the accrual treatment is significantly larger for changes in estimates ($0.04 per share) compared to restated observations ($0.03),[32] suggesting that firms may, on average, be more egregious with changes in estimates than with the postponing of a revision and subsequent restatement.

Panel B shows the results of the logistic regression predicting the likelihood of meeting or beating consensus as shown in Model 1. In this execution of the model, the coefficient on *upward_chg* represents the incremental likelihood to meet or beat for a firm that changes its estimate relative to those that subsequently restate, after controlling for other financial ratios which literature suggests influence the likelihood to meet or beat. Given the results of Donelson et al. (2013) and other papers suggesting firms manage earnings to beat expectations and subsequently restate their financials, I would expect *upward_chg* to have a positive (negative) coefficient if firms recognizing changes in estimates are more (less) aggressive at managing earnings relative to the firms that omit revision to an estimate and later restate it. The coefficient is, however, insignificant

[31] *Earn_report* (T-stat=6.89) and *earn_consensus* (T-stat=6.30) are significantly different between samples.
[32] T-statistic of 5.94.

(p-value=0.161), suggesting these firms are no more or less likely to beat expectations after controlling for other predictors.

In order to see if these firms start at a different position, Panel C investigates whether firms with changes in estimates would have been more likely to meet or beat compared to restated observations, absent the accounting treatment. I perform the same analysis as performed in Panel B, however I replace the dependent variable (*meet_beat1*) with whether earnings absent the accounting for the estimate would beat consensus expectations (*true_beat*). The coefficient on *upward_chg* in this model should shed light on whether firms that change estimates and firms that later restate differ in their starting point relative to expectations prior to determining accounting treatment. The coefficient is insignificant (p-value=0.371), suggesting these firms start, on average, no different relative to their respective benchmarks.

Overall, it is difficult to conclude something definitively based on insignificant coefficients. That being said, given extant literature document earnings management by firms which later restate earnings downward, finding no difference between those observations and the subset that changes estimates provides some corroborating evidence that changes in estimates are used advantageously.

4.3.3 Timing of the Change in Estimate – Fixed Effects Approach

While the preceding analysis addresses the issue of whether I have an appropriate comparison group, it is difficult to conclusively say whether it is the most appropriate comparison. In effort to further address this, I elect next to compare the firm only to itself in a fixed effect regression. In this analysis, all observations come from firms that

at one point report a change in estimate. I include firm-quarter observations containing changes in estimates as well as all other quarters for those firms with no changes in estimates. The latter set serves as the direct comparison for the same-firm observations with changes in estimates.

Table 6 shows the results from the fixed effect logistic regression predicting the likelihood to meet or beat consensus earnings expectations. The coefficient on *upward_chg* (*dnward_chg*) evidences any incremental increase or decrease in likelihood of a firm to beat expectations in a quarter it records an income increasing (decreasing) change in estimate relative to quarters in which it does not record a change. The coefficients for *upward_chg* and *dnward_chg* are both significant in the predicted directions (p-value < 0.0001 for both), suggesting a change in estimate influences the likelihood for a firm to beat expectations. The odds ratios (2.033 and 0.553, respectively) suggest a firm, ceteris paribus, is almost twice as likely to beat expectations in a quarter with an income increasing change in estimate and nearly half as likely to beat expectations in a quarter with an income decreasing change in estimate, relative to other quarters.

Table 6
Logistic Fixed Effect Regression of Meet or Beat on Changes in Estimates

Variable	Pred Sign	Coef.	Std. Err.	t	P>z
upward_chg	?	0.710	0.111	6.37	<.0001
dnward_chg	?	-0.593	0.088	-6.73	<.0001
book_to_mkt	+	-0.046	0.009	-4.91	<.0001
growth	?	0.003	0.004	0.65	0.516
loss	-	-0.659	0.052	-12.69	<.0001
roa	+	1.331	0.342	3.89	0.000
size	+	0.077	0.013	6.17	<.0001
disc_acc	?	-0.970	0.545	-1.78	0.038
meet_beat1_pq	+	0.556	0.035	16.10	<.0001
2-digit SIC Fixed Effects		NO			
Year Fixed Effects		YES			
Observations		27,368			
Psuedo R^2		0.080			
Area Under ROC		0.656			

This table reports the logistic fixed effects regression results for Model 1. All variables are defined in Appendix A. Reported p-values are one tailed. The sample includes all firm-quarter observations with sufficient data from 2003 to 2014 that report income increasing changes in estimates and all quarters from those firms which do not contain changes in estimates. The firm's quarters without income increasing changes in estimates serve as the control group for the observations with changes in estimates.

These results reinforce the conclusion that firms may use changes in estimates advantageously. When comparing the influence of a change in estimate on the likelihood to meet or beat, I find that a firm is more likely to meet or beat expectations when it records an income increasing change in estimate and less likely to meet or beat expectations when it records an income decreasing change in estimate, relative even to itself in other periods.

4.3.4 Changes in Estimates Influencing Meeting or Beating in Contiguous Quarters

A common comment regarding accruals earnings management—"accruals reverse"—suggests that increasing income through a change to an accrual may impact another period when it reverses. Another possibility is that the change in estimate follows a buildup of a reserve in a preceding period. In effort to address these possibilities, I perform the analysis outlined in Model 1 regressing one quarter behind and one quarter ahead likelihood to meet or beat expectations. If the change in estimate reverses in the next period, then there should be a lower likelihood of meeting or beating expectations. Similarly, if a reserve has been built prior to the change in estimate and recognition of the change is, in essence, emptying the reserve, then I would expect a lower likelihood of meeting or beating expectations in the preceding period.

Table 7 tabulates the analyses outlined above. The middle rows of Panels A and B correspond to the coefficients of interest seen in Panels A and B of Table 3, respectively. The coefficients on *upward_chg* and *dnward_chg* predicting the likelihood to meet or beat in the prior quarter (Panel A) are positive and negative, respectively, however neither is statistically significant. This holds true for the comparable

coefficients in Panel B, with directions consistent with predictions but neither being significant. The coefficients on *upward_chg* and *dnward_chg* in the regressions modeling the likelihood to meet or beat in the subsequent quarter are also insignificant in both Panel A and Panel B, suggesting the change in estimates do not influence the next period.

While these regressions may imply the effect of the change in estimate does not influence other periods, the results should be interpreted with caution. First, I limit the analysis to contiguous quarters and do not look further outside of that range. It is possible the building of a reserve or the reversal of the change occur several quarters prior to or after recognition of the change in estimate. Second, it is possible earnings in other periods were lower as a result of the change in estimate but the expectation was effectively influenced by managers to incorporate the lower earnings. For example, if a firm changes an estimate in a quarter and the effect reverses in the subsequent quarter, managers may provide guidance for the subsequent quarter that lowers expectations. The firm therefore may have no change in future likelihood to meet or beat expectations even with lower future income.

Table 7
Effect of Changes in Estimates on Contiguous Periods

Panel A: Consensus Forecast and Change in Estimate Indicator

Period	Coefficient on *upward_chg* (Std. Err.)	Coefficient on *dnward_chg* (Std. Err.)
Prior Quarter	0.144	-0.146
	(0.116)	(0.133)
Quarter of Change in Estimate	0.795 ***	-0.667 ***
	(0.130)	(0.126)
Subsequent Quarter	-0.003	0.177
	(0.112)	(0.137)

Panel B: Last Forecast and Change in Estimate Indicator

Period	Coefficient on *upward_chg* (Std. Err.)	Coefficient on *dnward_chg* (Std. Err.)
Prior Quarter	0.0961	-0.0828
	(0.112)	(0.131)
Quarter of Change in Estimate	0.649 ***	-0.514 ***
	(0.120)	(0.123)
Subsequent Quarter	0.0531	0.130
	(0.109)	(0.133)

This table reports the coefficients on the variables of interest in several alternative specifications of Model 1, as originally tested in Table 3. Specifically, the timing of the measurement of the dependent variable varies in each regression to assess if contiguous quarters to that of the change in estimate are influenced by the change in estimate. Each panel reports the coefficient and standard error corresponding the the variable of interest in the quarter before, of, and after recognition of an income increasing change in estimate. Panels A and B report the regression results predicting the likelihood of meeting or beating consensus forecast and last forecast, respectively.

4.3.5 Excluding Observations Not Expected to Manage Earnings

While the primary results suggest firms use changes in estimates to manage earnings, it is likely some of these firms simply benefit from doing proper accounting and appropriately recording the change. I attempt to identify these observations and remove them from my analysis. To do so, I look at the quarters preceding the period with a change in estimate to see if a firm could have beaten a missed threshold had it recorded the change in estimate in an earlier period.[33] The intuition behind this is that the firm would have presumably recognized the change in estimate in the earlier period to beat expectations if it was using such adjustments advantageously. This eliminates 190 observations from the change in estimate sample in the main analysis and the corresponding matched control observations. Excluding these observations results in a sample of 2,073 observations.

Panel A of Table 8 shows selected descriptive statistics for this revised sample, with 72.9 percent (71.6 percent) of observations with changes in estimates meeting or beating consensus analyst forecast (the most recent forecast). These values are not significantly different from those in the original sample, nor do they differ significantly from the values corresponding to the control sample (71.1 and 69.3 percent, respectively).

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[33] Specifically, for observations in the second, third, or fourth quarter of a fiscal year, I look at whether the firm missed consensus expected earnings in the preceding quarters within that year. If the firm missed expectations but would have beaten expectations had it recorded the change in estimate in such quarter, I categorize that firm as less likely to be managing earnings in the period it recorded the change in estimate and remove these observations for this analysis. If an observation with a change in estimate occurs in the first quarter of the fiscal year, I perform the same review, however only looking back to the fourth quarter of the preceding fiscal year.

Panel B shows the results of the logistic regression predicting the likelihood to meet or beat, as shown in Model 1. In this analysis, firms with income increasing (decreasing) changes in estimates are significantly more (less) likely to meet or beat expectations (Z-stat=5.44 and Z-stat=4.46 for *upward_chg* and *dnward_chg*, respectively). The odds ratio on *upward_chg* (*dnward_chg*) suggests the likelihood of meeting or beating expectations increases 109.7 percent (decreases 43.9 percent) relative to the control sample.

Panel C and Panel D of this table show the results of the analysis of the relationship between the incentives to manage earnings, as originally shown in Table 4. The coefficient on the variable of interest, *miss_wo*under_over_wo*, is insignificant (t stat=0.55), suggesting no difference in the magnitude of the change in estimate and the desire to manage earnings. Of the observations that would have missed expectations without the change in estimate, however, the size of the changes for those that did meet expectations ($0.046 per share) is significantly larger than those that failed to beat expectations (-$0.003 per share), suggesting the magnitude may have an association when the firms successfully use changes in estimates to manage earnings.

In whole, the results shown in Table 8 suggest that the main results are robust to at attempt to parse apart firms whose behavior in prior periods suggest they are not managing earnings from the rest of the firms.

Table 8
Main Analyses Excluding Firms Not Likely to Manage Earnings

Panel A: Descriptive Statistics

	Income increasing changes in estimates				Propensity-matched control observations			
Variable	N	mean		p50	sd	N	mean	p50	sd
meet_beat1	1047	0.729		1.000	0.445	1026	0.711	1.000	0.454
meet_beat2	1047	0.716		1.000	0.451	1026	0.693	1.000	0.461
upward_chg	1047	0.554		1.000	0.497	1026	0.000	0.000	0.000
earn_report	1047	0.285		0.200	0.393	1026	0.266	0.200	0.356
earn_consensus	1047	0.273		0.200	0.381	1026	0.259	0.190	0.352
last_frcst	1045	0.270		0.200	0.417	1025	0.259	0.190	0.384
earn_surprise1	1047	0.012	***	0.010	0.040	1026	0.007	0.010	0.024
earn_surprise2	1045	0.013	***	0.010	0.054	1025	0.006	0.010	0.037
effect_eps	1047	0.007		0.002	0.034	1026	-	-	-

Panel B: Likelihood to Meet or Beat

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	+	0.740	0.136	5.44	0.000
dnward_chg	-	-0.579	0.130	-4.46	0.000
book_to_mkt	-	-0.038	0.040	-0.94	0.346
growth	+	0.080	0.175	0.46	0.647
loss	-	-0.715	0.171	-4.18	0.000
roa	+	1.785	1.729	1.03	0.302
size	+	0.056	0.036	1.55	0.122
disc_acc	+	0.179	2.011	0.09	0.929
meet_beat1_pq	+	0.593	0.118	5.03	0.000
Fama-French-17 FE		YES			
Year Fixed Effects		YES			
Observations		2,073			
Psuedo R^2		0.099			
Area Under ROC		0.711			

Panel C: Influence of the Incentive to Manage Earnings on the Magnitude of the Change in Estimate

Variable	Pred. Sign	Coef.	Std. Err.	t	P>t
miss_wo	+	0.001	0.004	0.32	0.749
under_over_wo	?	0.179	0.077	2.32	0.021
*miss_wo*under_over_wo*	+	0.079	0.144	0.55	0.584
Year Fixed Effects		YES			
Adjust R^2		0.034			
Observations		1047			

Panel D: Subsample means

Subset	*effect_eps*		*under_over_wo*	
miss_wo=1	0.008		0.026	
earn_report < earn_consensus	-0.003		0.028	
earn_report ≥ earn_consensus	0.046		0.022	
t-statistic	27.902	***	3.790	***

This table performs earlier analyses on a subset of the original sample which excludes observations that are identified as unlikely to record a change in estimate to manage earnings. These firms are identified by observing whether recognition of the change in estimate in a prior period would have allowed the firm to beat expecations. Panels A, B, C, and D parallel results in Table 1, Table 3, Panel A of Table 4, and Panel B of Table 4, respectively. All variables are defined in Appendix A.

4.3.6 Managing Earnings Through Changes in Estimates for Serial Changers

A potential alternative explanation for my results is that my variable of interest captures a set of firms that routinely change estimates and that these firms differ fundamentally from other firms. This would imply that my variable of interest identifies firms that manage earnings to successfully meet or beat expectations and the effect of recognizing a change in estimate is a byproduct this identifying of "serial estimate changer" firms. In effort to address this possibility, I separate the original sample into serial changers and observations that belong to firms that do not frequently recognize changes in estimates. I define a serial changer as a firm that recognizes a change in estimate in more than half of the years the firm exists in Compustat within 2003 to 2014.[34] If a firm records a change in estimate in more than half of its years, *serial_chger* equals 1 in all quarters. *Serial_chger* is 0 for all other observations.

Table 9 introduces the main effect, *serial_chger*, and interactions with both *upward_chg* and *dnward_chg* into Model 1. If serial changers are fundamentally more likely to successfully meet or beat expectations, then I expect a significantly positive main effect of *serial_chger*. If serial changers are more effective at using changes in estimates to beat expectations, the interaction with *upward_chg* should be positive and significant. If these firms truly drive the results from my original analyses, then the coefficient on *upward_chg* should lose statistical significance.

[34] I further require that a firm exist in the 2003 to 2014 window for at least 5 years. I hesitate to categorize a firm that exists for only 3 years and recognizes two changes in estimates in different years as a serial changer, and therefore use this threshold to only identify long-lasting firms as potential serial changers.

The results in Table 9 suggest serial changers do not drive my results. The coefficients on *serial_chger*, *upward_chg*serial_chger*, and *dnward_chg*serial_chger* are statistically insignificant (Z-stat of 0.52, 0.93, and 1.39, respectively). This suggests no fundamental difference between serial changer firms and other firms with respect to the likelihood to meet or beat expectations, nor do they use changes in estimates to meet or beat any differently from firms which infrequently recognize changes in estimates. The main effect of *upward_chg* (*dnward_chg*) is still positive (negative) and significant (Z-stat=5.62 and 5.53, respectively), showing that firms with infrequent use of changes in estimates are more (less) likely to meet or beat expectations when they record income increasing (decreasing) changes in estimates. The odds ratios for these are generally consistent with earlier results. Firms with income increasing changes in estimates are roughly twice as likely to meet expectations and firms with income decreasing changes in estimates are half as likely to meet expectations, relative to the PSM sample.

Table 9
Logistic Regression of Meet or Beat on Changes in Estimates and Serial Changers

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	+	0.760	0.135	5.62	0.000
dnward_chg	-	-0.714	0.129	-5.53	0.000
serial_chger	?	-0.254	0.484	-0.52	0.300
*upward_chg*serial_chger*	?	0.588	0.630	0.93	0.176
*dnward_chg*serial_chger*	?	0.930	0.670	1.39	0.083
book_to_mkt	-	-0.028	0.039	-0.73	0.234
growth	+	0.266	0.161	1.65	0.049
loss	-	-0.900	0.156	-5.76	0.000
roa	+	0.817	1.504	0.54	0.294
size	+	0.072	0.033	2.17	0.015
disc_acc	+	-1.495	1.947	-0.77	0.222
meet_beat1_pq	+	0.571	0.106	5.40	0.000
Fama-French-17 FE		YES			
Year Fixed Effects		YES			
Observations		2,439			
Psuedo R^2		0.102			
Area Under ROC		0.715			

This table reports the logistic regression results comparable to those in Table 3, however with the inclusion of two additional variables of interest. All variables are defined in Table 1 or herein. Reported p-values are one tailed. The sample includes all firm-quarter observations with sufficient data from 2003 to 2014 that report income increasing changes in estimates and the propensity score matched sample of control firms. *Serial_chger* is an indicator equal to 1 for all firms which report a change in estimate in more than half of the years they exist in Compustat. I further restrict that a firm must exist in Compustat for at least 5 years to be classified as a serial changer. I also include the interaction between *upward_chg* and *serial_chger* to investigate whether firms which routinely report changes in estimates are more likely to use them to meet or beat expectations relative to firms which infrequently report changes in estimates.

4.3.7 Importance of a Streak of Meeting or Beating

While my primary analyses suggest managers recognize changes in estimates to meet or beat analyst expectations, presumably this relationship should strengthen when the incentive to meet or beat expectations is stronger. The first additional analysis, shown in Table 4, uses the distance from consensus earnings as a proxy for the strength of the incentive, showing a relationship between the size of the change in estimate and the distance below consensus earnings. In effort to take an alternative approach on investigating the influence of the incentive, I include the count of consecutive meet or beat quarters (*streak*). Kross, Ro, and Suk (2011) and Xie (2011) find that maintaining a streak of consecutive quarters of meeting or beating expectations is increasingly important to managers. For example, if a firm beat expectations in its second and third quarters but not the first, the value of *streak* for the fourth quarter would be two. If the same firm continues to beat expectations for ten more quarters, then the value of streak would be 12. The incentive to continue the streak grows with the magnitude, suggesting a value of 12 for streak indicates stronger incentive to manage earnings than a value of two. I therefore include the main effect of *streak* into Model 1 as well as an interaction with *upward_chg*. If the streak provides additional incentive to use changes in estimates to beat expectations, I would expect the coefficient on the interaction term to be positive and significant.

Table 10
Logistic Regression of Meet or Beat on Changes in Estimates and Streaks in Meeting Expectations

Panel A: Meet or Beat Consensus

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	+	0.938	0.156	6.02	0.000
dnward_chg	-	-0.760	0.156	-4.88	0.000
streak	+	0.062	0.015	4.23	0.000
*upward_chg*streak*	?	-0.041	0.025	-1.66	0.049
*dnward_chg*streak*	?	0.042	0.033	1.28	0.101
book_to_mkt	-	-0.013	0.039	-0.33	0.372
growth	+	0.278	0.161	1.73	0.042
loss	-	-0.877	0.157	-5.58	0.000
roa	+	0.805	1.512	0.53	0.297
size	+	0.030	0.034	0.91	0.183
disc_acc	+	-1.518	1.952	-0.78	0.219
meet_beat1_pq	+	0.275	0.119	2.31	0.011
Fama-French-17 FE		YES			
Year Fixed Effects		YES			
Observations		2,439			
Psuedo R^2		0.113			
Area Under ROC		0.728			

Panel B: Meet or Beat Last Forecast

Variable	Pred Sign	Coef.	Std. Err.	z	P>z
upward_chg	+	0.638	0.146	4.35	0.000
dnward_chg	-	-0.729	0.151	-4.83	0.000
streak	+	0.032	0.014	2.33	0.010
*upward_chg*streak*	?	0.006	0.027	0.2	0.420
*dnward_chg*streak*	?	0.087	0.035	2.46	0.007
book_to_mkt	-	-0.025	0.038	-0.65	0.259
growth	+	0.280	0.157	1.78	0.038
loss	-	-0.697	0.154	-4.52	0.000
roa	+	0.435	1.485	0.29	0.385
size	+	-0.004	0.031	-0.14	0.444
disc_acc	+	1.616	1.879	0.86	0.195
meet_beat2_pq	+	0.302	0.114	2.65	0.004
Fama-French-17 FE		YES			
Year Fixed Effects		YES			
Observations		2,439			
Psuedo R^2		0.078			
Area Under ROC		0.684			

This table reports the logistic regression results comparable to those in Table 3, however with the inclusion of two additional variables of interest. All variables are defined in Table 1 or herein. Reported p-values are one tailed. The sample includes all firm-quarter observations with sufficient data from 2003 to 2014 that report income increasing changes in estimates and the propensity score matched sample of control firms. *Streak* is the count of consecutive quarters leading into the observation in which the firm has met or exceeded expectations. I also include the interaction between *upward_chg* and *streak* to investigate whether firms with longer streaks of meeting or beating are more likely to use changes in estimates to meet expectations.

Table 10 shows the results of the analyses of the interaction of using changes in estimates and the increased incentive to meet or beat expectations. Panel A defines expectations as the consensus analyst forecast (*meet_beat1*). The main effects of *upward_chg* (coef=0.938, Z-stat=6.02) and *streak* (coef=0.062, Z-stat=4.23) are both positive and significant, suggesting both are associated with a higher likelihood of meeting or beating consensus forecasts. The coefficient on *dnward_chg* (coef=-0.760, Z-stat=4.88) is still negative and significant, suggesting these changes in estimates are associated with a lower likelihood of meeting expectations. The interaction (*upward_chg*streak*), however, is significantly negative (coef=-0.041, Z-stat=1.66) suggesting firms are less likely to use changes in estimates to meet or beat consensus forecast as the length of the streak of consecutive periods of meeting expectations increases. The coefficient on *dnward_chg*streak* is insignificant. Panel B shows the same analysis but with expectations defined as the last forecast (*meet_beat2*). Results for the main effects of *upward_chg*, *dnward_chg*, and streak are consistent with those in Panel A. The interactions, however, show different results with *upward_chg*streak* having no significance and *dnward_chg*streak* significant and positive (coef=0.087, Z-stat=2.46).

These results unfortunately do not provide conclusive evidence that the strength of the incentive to manage earnings influences the use of changes in estimates to meet or beat. While they seem to contradict the results in Section 4.3.1, they still support the primary findings that changes in estimates are associated with a higher likelihood of meeting or beating expectations.

CHAPTER V

CONCLUSIONS

The earnings management literature has established that managers use accruals to meet certain thresholds, including analyst expectations. This paper provides evidence of this phenomena using disclosure of changes in estimates. My findings suggest that managers recognize changes in estimates advantageously to meet or beat analyst expectations and that the magnitude of the change is associated with the strength of the incentive to manage earnings. I focus on changes in estimates since they exemplify manager action with discretionary accounts. This study complements earnings management studies using specific financial statement line items such as bad debt expense (Teoh et al. 1998), claim loss reserves (Beatty et al. 2002; Nelson, 2000), and taxes (Dhaliwal et al. 2004) by identifying a disclosure which evidences earnings management through such accounts. The incremental contribution of my paper is that I examine a broader set of specifically identified accruals. My findings are corroborated by a series of additional analyses which focus on the relationship between changes in estimates and meeting expectations relative to other comparison groups, across other periods, and in different subsets. I find that firms have a higher likelihood to meet expectations in periods in which they record changes in estimates, relative to themselves in other periods. They also have similar meet or beat earnings management behavior to firms that later restate earnings downward for estimate accounts. These firms reap no incremental benefit in contiguous quarters. Specifically, they are no different in

likelihood to meet or beat in either the quarter preceding or the quarter following recognition of a change in estimate relative to a control group without changes in estimates. In aggregate, I provide convincing evidence that firms use changes in estimates advantageously.

While I examine the use of changes in estimates to manage earnings, I do not perform an in-depth analysis of which specific estimate accounts are used. I believe this could be a fertile area of future research that may further add to our understanding of accruals management. I also only examine the incentive to meet or beat analyst expectations. Other incentives to manage earnings may provide similar motivation to recognize changes in estimates; investigation of other incentives may shed light on the breadth of the association between changes in estimates and earnings management. Additionally, my results do not speak to the value relevance of changes in estimate disclosures for investors. It is difficult to isolate market response to a single disclosure contained in 10-K or 10-Q reports, however this is another potential area of future research. It may be of interest to determine if auditors or those charged with corporate governance influence whether changes in estimates are recorded with or without managerial bias. In summary, changes in estimates provide an interesting area for future research.

REFERENCES

Bartov, E., Givoly, D., and Hayn, C. 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33 (2): 173-204.

Beatty, A. L., Ke, B., and Petroni, K. R. 2002. Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review* 77 (3): 547-570.

Bradshaw, M. T., Lee, L. F., and Peterson, K. 2016. The interactive role of difficulty and incentives in explaining the annual earnings forecast walkdown. *The Accounting Review* 91 (4): 995-1021.

Brown, L. D. 2001. A temporal analysis of earnings surprises: Profits versus losses. *Journal of Accounting Research* 39 (2): 221-241.

Brown, L. D., and Pinello, A. S. 2007. To what extent does the financial reporting process curb earnings surprise games? *Journal of Accounting Research* 45 (5): 947-981.

Burgstahler, D., and Eames, M. 2006. Management of earnings and analysts' forecasts to achieve zero and small positive earnings surprises. *Journal of Business Finance & Accounting* 33 (5-6): 633-652.

Collins, D. W., Pungaliya, R. S., and Vijh, A. M. 2017. The effects of firm growth and model specification choices on tests of earnings management. *The Accounting Review* 92 (2): 69-110.

Dechow, P. M., and Dichev, D. 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 70 (Supplement): 35-59.

Dechow, P. M., Sloan, R. G., and Sweeney, A. P. 1995. Detecting earnings management. *The Accounting Review* 70 (2): 193-225.

Degeorge, F., Patel, J., and Zeckhauser, R. 1999. Earnings management to exceed thresholds. *The Journal of Business* 72 (1): 1-33.

Dhaliwal, D. S., Gleason, C. A., and Mills, L. F. 2004. Last-chance earnings management: Using the tax expense to meet analysts' forecasts. *Contemporary Accounting Research* 21 (2): 431-459.

Donelson, D. C., McInnis, J. M., and Mergenthaler, R. D. 2013. Discontinuities and earnings management: Evidence from restatements related to securities litigation. *Contemporary Accounting Research* 30 (1): 242-268.

Doyle, J. T., Jennings, J. N., and Soliman, M. T. 2013. Do managers define non-GAAP earnings to meet or beat analyst forecasts? *Journal of Accounting and Economics* 56 (1): 40-56.

FASB (Financial Accounting Standards Board). 2010. Statement of Financial Accounting Concepts No. 8, Stamford, CT.

FASB (Financial Accounting Standards Board). (n.d.). ASC 250-10-50-4. Retrieved September 17, 2016 from FASB Accounting Standards Codification database, Stamford, CT.

Frank, M. M., and Rego, S. O. 2006. Do managers use the valuation allowance account to manage earnings around certain earnings targets? *Journal of the American Taxation Association* 28 (1): 43-65.

Genworth Financial, Inc. 2014. Form 10-K 2013. Retrieved from SEC EDGAR website httm://www.sec.gov/edgar.shtml

Gilliam, T. A., Heflin, F., and Paterson, J. S. 2015. Evidence that the zero-earnings discontinuity has disappeared. *Journal of Accounting and Economics* 60 (1): 117-132.

Griffith, E. E., Hammersley, J. S., and Kadous, K. 2015. Audits of complex estimates as verification of management numbers: How institutional pressures shape practice. *Contemporary Accounting Research* 32 (3): 833-863.

Griffith, E. E., Hammersley, J. S., Kadous, K., and Young, D. 2015. Auditor mindsets and audits of complex estimates. *Journal of Accounting Research* 53 (1): 49-77.

Gu, Z., and Chen, T. 2004. Analysts' treatment of nonrecurring items in street earnings. *Journal of Accounting and Economics* 38 (1): 129-170.

Healy, P. M., and Wahlen, J. M. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13 (4): 365-383.

Hribar, P., and Collins, D. W. 2002. Errors in estimating accruals: Implications for empirical research. *Journal of Accounting Research* 40 (1): 105-134.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (2): 193-228.

Kasznik, R., and McNichols, M. F. 2002. Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research* 40 (3): 727-759.

Kothari, S. P., Leone, A. J., and Wasley, C. E. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (1): 163-197.

Kross, W. J., Ro, B. T., and Suk, I. 2011. Consistency in meeting or beating earnings expectations and management earnings forecasts. *Journal of Accounting and Economics* 51 (1): 37-57.

Lopez, T. J., and Rees, L. 2002. The effect of beating and missing analysts' forecasts on the information content of unexpected earnings. *Journal of Accounting, Auditing & Finance* 17 (2): 155-184.

Mauldin, E. G., and Wolfe, C. J. 2014. How Do Auditors Address Control Deficiencies that Bias Accounting Estimates? *Contemporary Accounting Research* 31 (3): 658-680.

Nelson, K. K. 2000. Rate regulation, competition, and loss reserve discounting by property-casualty insurers. *The Accounting Review* 75 (1): 115-138.

Petroni, K., and Beasley, M. 1996. Errors in accounting estimates and their relation to audit firm type. *Journal of Accounting Research* 34 (1): 151-171.

Richardson, S., Teoh, S. H., and Wysocki, P. D. 2004. The walk-down to beatable analyst forecasts: The role of equity issuance and insider trading incentives. *Contemporary Accounting Research* 21 (4): 885-924.

Salterio, S., and Koonce, L. 1997. The persuasiveness of audit evidence: The case of accounting policy decisions. *Accounting, Organizations and Society* 22 (6): 573-587.

Shipman, J. E., Swanquist, Q. T., and Whited, R. L. 2017. Propensity score matching in accounting research. *The Accounting Review* 92 (1): 213-244.

Teoh, S. H., Wong, T. J., and Rao, G. R. 1998. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3 (1-2): 175-208.

Xie, Y. 2011. The market effects of breaking a string of meeting or beating analysts' expectations: downward revision of future cash flows or increase in cost of equity capital? *Journal of Business Finance & Accounting* 38 (1-2): 95-118.

APPENDIX A

VARIABLE DEFINITIONS

Name	**Description**
Variables of Interest	
upward_chg	1 if the effect of the change in estimate increases income in the current period; 0 otherwise.
effect_eps	Magnitude of the income effect of the estimate change in quarter t, scaled by outstanding shares for diluted earnings per share. Winsorized at 1% and 99%.
earn_report	Reported per-share earnings for quarter t, from I/B/E/S. Winsorized at 1% and 99%.
consensus	Average per-share earnings forecast from the final analyst forecast before quarter end of quarter t. Winsorized at 1% and 99%.
last_frcst	Final analyst forecast for quarter t prior to period end. Winsorized at 1% and 99%.
meet_beat1	1 if the firm's reported earnings exceed the consensus forecast; 0 otherwise.
meet_beat2	1 if the firm's reported earnings exceed the last analyst forecast; 0 otherwise.
earn_surprise1	The difference between reported earnings and consensus earnings. Winsorized at 1% and 99%.
earn_surprise2	The difference between reported earnings and the last analyst forecast. Winsorized at 1% and 99%.
act_cadj	Reported earnings less the consensus forecast with the effect of the change in estimate removed from earnings. If an observation does not have a change in estimate then this is equal to the earnings surprise.
Controls for Main Models	
book_to_mkt	The ratio of the book value of equity to the market value of equity.
growth	The growth rate of quarterly sales relative to the same quarter in the prior year.
loss	1 if earnings for the quarter are negative; 0 otherwise.
ROA	Ratio of quarterly income before extraordinary items to total assets for quarter t.
size	Natural logarithm of the market value of equity.
Tobins_Q	The ratio of the market value of assets to the book value of assets.

Name	Description
accruals	Total accruals from the Collins et al. (2017) model with quarterly dummies for ROA, sales growth, and market-to-book quintiles.
disc_acc	Signed abnormal accruals from the Collins et al. (2017) model with quarterly dummies for ROA, sales growth and market-to-book quintiles.
Additional Variables for Magnitude Model	
under_over_wo	The difference between consensus per-share earnings and reported per share earnings excluding the income effect of the change in estimate.
miss_wo	1 if the firm would have missed consensus without the change in estimate; 0 otherwise.
Additional Variables for Restatement Versus Change in Estimate Analysis	
est_adj	The per share magnitude of the effect of the estimate adjustment. This is the same as *effect_eps* for observations with changes in estimates. It is calculated as the difference between restated earnings per share and earnings per share as first reported.
true_earn	Reported earnings less the income effect of the change in estimate or plus the income effect of the restatement, depending on the type of adjustment.
true_beat	1 if *true_earn* meets or exceeds *earn_consensus*; 0 otherwise.
Additional Variables for Serial Changers Analysis	
serial_chger	1 if the firm recognizes a change in estimate in 50 percent or more of the years it exists in Compustat between 2003 and 2014, conditional on it existing in Compustat during that period for a minimum of five years; 0 otherwise.
Additional Variables for Streak Analysis	
streak	The count of consecutive quarters preceding quarter t in which the firm has met or exceeded consensus forecast.

APPENDIX B

DISCUSSION OF CHANGES IN ESTIMATES

Tables B1 and B2 provide descriptive information on the nature of observations with changes in estimates. Table B1 breaks out all 1,237 changes in estimates into the Fama-French 17 Industry categories. The largest portion of the sample reside in the Other category, with 267 (249) of the income increasing (decreasing) observations. Machinery and Business Equipment contains the next largest portion of the sample, with 116 (84) income increasing (decreasing) changes in estimates. The columns of Table B1 break out the category tags for the changes in estimate. These categories do not easily reconcile to the total observations per Industry category since changes in estimates may have several tags. For example, the two income increasing changes in estimates in the Mining and Minerals Industry have tags for depreciation method, restructuring, and accruals. Perhaps unsurprisingly, changes in estimates tagged as accruals comprise of a large portion of observations, with 317 observations having the change categorized as impacting accruals. Restructuring (200 observations), property, plant, & equipment (184), and executive compensation (155) are the next three most frequently tagged categories for changes in estimates.

Table B2 provides insight into the temporal trends in changes in estimates. Panel A shows the year-to-year totals of changes in estimates, with peaks occurring in 2006 (83 income increasing and 64 income decreasing observations) and 2009 (85 increasing income and 63 decreasing income). Very few changes in estimates occur in 2003 or

2004, however the frequency of income increasing changes remains in the fifty to ninety range with the exception of 2012 (36 observations) and 2013 (45). Income decreasing changes in estimates show a similar pattern, with frequencies staying within the forty to seventy range after 2004. Similar to the columns in Table B1, Table B2 provides detail on the tagged categories of changes in estimates for the detail totaled in the row detail. Changes in estimates pertaining to executive compensation and options escalate from 2006 to 2009. Changes in estimates tagged as issues pertaining to revenue contracts pick up in 2013 and 2014 with 10 and 18 income increasing (21 and 18 income decreasing) observations, respectively.

Panel B shows the frequency of recognition of changes in estimate by fiscal quarter. The first (192 observations) and fourth (192) quarters have more income increasing changes in estimates than the second (138) and third quarters (134). Income decreasing changes in estimate also occur most frequently in the fourth quarter (221 observations), however the first three quarters are comparable in frequency of changes (139, 120, and 101 observations for the first, second, and third quarters, respectively). Acquisition and restructuring related changes in estimates occur more frequently in the first and fourth quarters, as do changes in accrual-related estimates.

TABLE B1
Industry and Category Breakdown of Changes in Estimates

Fama-French 17 Classifications	Obs	ada	invest_fv	loan_loss_res	acq_and_reorg	aro	prepaids	consol	debt_eq	exec_comp	depr_method	ppe_salv_val	ppe_life	exps	derivs	interco	inv_lcm	inv_eq	inv_cost	commits	ins_ibnr	restruct	warranty	accruals	other	pension	ppe_impair	int_gw_impair	rev_rec	rev_contract	rev_giftcard	rev_licensing	rev_retmall	rev_rebates	sec_comment	options	tax
Income Increasing Changes in Estimates																																					
Food	11	-	-	-	-	-	-	-	-	2	-	-	3	1	-	-	-	-	3	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	2	-
Mining and Minerals	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Oil & Petrolium Products	12	-	-	-	-	2	-	-	-	1	1	1	4	1	1	-	-	-	-	2	-	-	-	1	2	-	-	-	-	-	-	-	-	-	1	-
Textiles, Apparel & Footware	7	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	1	-	1	2	-	-	-	-	2	-	-	-	-	1	-
Consumer Durables	5	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	2	1
Chemicals	11	-	-	-	-	-	-	-	-	1	-	-	3	-	-	-	-	-	-	-	-	3	-	4	-	1	-	-	-	-	-	-	-	-	1	2
Drugs, Soap, Prfums, Tobacco	30	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	1	2	-	7	-	9	2	-	-	-	5	-	-	6	6	1	-	2	1
Construction and Construction Materials	10	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	2	-	-	3	1	1	-	-	-	4	-	-	-	-	-	1	-
Steel Works Etc	8	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	2	-	2	-	1	-	-	-	-	-	-	-	-	-	1
Fabricated Products	8	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	1	2	3	-	-	-	-	-	2	-	-	-	-	-	1
Machinery and Business Equipment	116	3	-	-	9	-	-	-	-	16	1	1	8	2	-	-	-	1	1	13	1	32	13	48	13	1	-	-	4	4	-	-	-	-	16	14
Automobiles	9	-	-	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1	3	2	6	1	-	-	-	-	1	-	-	-	-	-	-
Transportation	44	-	-	-	2	-	-	-	-	1	1	5	5	-	-	-	-	-	-	4	5	-	1	7	4	-	-	-	2	20	1	-	-	-	-	1	1
Utilities	16	-	-	-	-	1	-	-	-	-	1	-	6	1	1	-	-	-	-	2	-	1	-	1	2	2	-	-	1	1	-	-	-	-	-	-	1
Retail Stores	42	-	-	-	1	-	1	-	-	13	-	-	6	-	-	-	-	1	1	1	1	6	-	8	2	-	-	-	1	-	8	-	1	1	-	13	1
Banks, Insurance Companies, and Other Financi	58	3	-	3	5	-	-	-	-	13	-	1	3	1	-	-	-	-	-	7	4	-	-	8	7	-	-	-	6	-	1	-	-	-	-	13	13
Other	267	8	-	1	21	1	-	-	-	30	1	10	27	4	-	-	-	-	-	20	11	60	4	88	20	1	-	2	27	18	1	-	3	3	1	27	30
Income Decreasing Changes in Estimates																																				
Food	18	-	-	-	-	-	-	1	-	2	-	-	8	-	-	-	-	-	3	-	1	1	-	3	1	2	-	-	-	-	-	-	-	-	-	2	-
Mining and Minerals	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
Oil & Petrolium Products	17	-	-	-	-	16	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Textiles, Apparel & Footware	4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	1
Consumer Durables	6	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	1	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	1	-
Chemicals	10	-	-	-	1	2	-	-	-	3	-	-	2	-	-	1	-	-	-	-	-	1	-	2	1	-	-	-	-	-	-	-	-	-	3	-
Drugs, Soap, Prfums, Tobacco	30	-	-	-	1	-	-	-	-	3	1	-	5	-	-	-	-	-	-	2	-	3	-	3	3	-	-	-	3	3	-	2	6	2	-	3	-
Construction and Construction Materials	17	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	5	5	2	-	-	-	-	8	-	-	-	-	-	-
Steel Works Etc	5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-
Fabricated Products	6	-	-	-	1	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	1	-	1	2	-	-	-	-	-	1	-	-	-	-	-	-
Machinery and Business Equipment	84	1	-	-	4	1	-	-	-	17	1	-	6	-	-	-	-	1	1	7	-	14	6	22	7	1	-	-	-	23	-	-	1	-	-	17	5
Automobiles	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-
Transportation	44	-	-	-	1	-	-	-	-	1	1	4	5	-	-	-	-	-	-	2	-	1	-	2	2	-	-	1	-	30	1	-	-	-	-	1	-
Utilities	24	1	-	-	-	9	-	-	-	1	2	-	5	-	-	-	-	-	-	3	-	-	-	4	3	-	-	-	2	-	-	-	-	-	-	1	1
Retail Stores	39	-	-	-	1	-	1	-	-	5	-	-	7	-	-	-	1	1	4	7	-	8	-	12	8	-	-	-	1	-	3	-	1	-	-	5	2
Banks, Insurance Companies, and Other Financi	24	-	-	1	-	-	-	-	1	9	-	-	3	-	1	-	-	-	-	1	1	1	-	5	2	-	-	-	2	-	-	-	-	-	-	9	1
Other	249	4	-	-	19	5	-	-	-	29	2	3	64	1	-	1	-	1	4	22	1	49	-	59	23	-	-	6	19	13	1	4	3	-	-	28	16
Total	1237	20	-	6	71	39	2	1	1	155	13	26	184	11	3	2	1	6	21	104	29	200	35	317	111	12	1	9	73	129	18	12	21	7	1	150	92

TABLE B2
Temporal and Categorical Breakdown of Changes in Estimates

Fiscal Year	obs	ada	invest_fv	loan_loss_res	acq_and_reorg	aro	prepaids	consol	debt_eq	exec_comp	depr_method	ppe_salv_val	ppe_life	exps	derivs	interco	inv_lcm	inv_eo	inv_cost	commits	ins_ibnr	restruct	warranty	accruals	other	pension	ppe_impair	int_gw_impair	rev_rec	rev_contract	rev_giftcard	rev_licensing	rev_retmall	rev_rebates	sec_comment	options	tax
Income Increasing Changes in Estimates																																					
2003	10	-	-	-	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	-	4	-	5	1	1	-	-	-	-	-	-	1	-	-	1	-
2004	25	-	-	-	1	-	-	-	-	-	-	-	3	-	-	-	-	1	1	-	-	11	1	13	-	-	-	-	2	-	-	-	-	-	-	-	6
2005	51	3	-	-	-	1	-	-	-	2	-	3	5	-	-	-	-	1	1	4	3	16	1	24	4	1	-	-	2	-	2	1	1	-	-	2	6
2006	83	2	-	1	1	-	-	-	-	12	2	3	8	2	1	-	-	1	1	11	4	22	1	32	11	-	-	-	2	-	3	1	-	1	-	12	7
2007	70	3	-	-	4	1	-	-	-	11	-	1	8	2	-	-	-	-	-	5	1	13	3	20	5	1	-	-	6	1	-	1	3	1	-	11	5
2008	60	-	-	1	2	-	-	-	-	16	1	-	9	1	-	-	-	-	-	1	2	11	1	15	1	-	-	-	3	3	-	2	1	2	-	16	8
2009	85	4	-	1	5	1	-	-	-	22	1	-	4	-	-	-	-	-	1	4	2	15	4	23	4	-	-	1	8	5	3	-	-	-	-	21	7
2010	71	1	-	1	8	2	-	-	-	5	-	2	7	2	1	-	-	-	3	10	3	7	5	18	10	-	-	-	7	3	2	-	1	-	-	4	7
2011	58	-	-	-	13	-	1	-	-	5	-	2	7	-	-	-	-	-	1	13	2	9	2	17	14	1	-	-	3	5	1	-	-	-	-	5	5
2012	36	-	-	-	2	-	-	-	-	1	-	3	5	1	-	-	-	-	-	2	3	2	2	8	2	1	-	-	1	5	-	1	3	1	1	-	4
2013	45	1	-	-	2	1	-	-	-	5	2	3	6	-	-	-	-	-	-	3	2	-	2	4	3	1	-	-	5	10	-	-	-	-	-	5	6
2014	62	-	-	-	4	-	-	-	-	3	-	1	6	2	-	-	-	-	-	3	3	8	1	13	3	1	-	1	7	18	2	-	-	-	-	3	5
Income Decreasing Changes in Estimates																																					
2003	5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
2004	23	1	-	-	3	1	-	-	-	-	1	-	7	-	-	-	-	-	-	5	-	5	-	6	5	-	-	-	-	-	-	-	1	-	-	-	2
2005	51	-	-	1	4	-	-	-	-	4	-	-	13	-	-	-	-	1	3	10	-	9	1	18	10	-	1	1	1	-	-	-	1	-	-	4	2
2006	64	1	-	-	4	1	-	-	-	9	1	-	17	-	-	-	-	-	-	3	1	11	-	16	3	2	-	-	2	2	-	2	2	-	-	9	3
2007	58	-	-	-	2	2	1	-	-	14	-	-	8	-	-	1	-	-	3	5	1	9	-	12	6	1	-	-	4	3	-	1	1	1	-	14	2
2008	64	1	-	-	1	6	-	-	-	8	1	-	11	-	-	-	-	1	1	4	-	15	2	18	4	-	-	-	1	2	1	1	4	1	-	8	5
2009	63	1	-	-	3	6	-	-	1	11	1	3	10	-	-	-	-	-	1	1	1	14	-	17	2	-	-	-	2	7	2	-	-	-	-	11	3
2010	51	-	-	-	2	3	-	-	-	6	-	2	9	-	1	-	-	-	1	7	-	9	2	14	7	-	-	-	2	8	-	-	1	-	-	6	3
2011	44	-	-	1	4	3	-	-	-	4	3	1	8	1	-	1	-	1	2	7	-	3	2	8	8	-	-	1	4	5	-	1	-	-	-	4	1
2012	47	2	-	-	-	4	-	-	-	5	-	1	12	-	-	-	-	-	-	-	-	-	1	2	1	1	-	2	7	13	-	1	1	-	-	5	-
2013	49	-	-	-	-	4	-	-	-	4	-	-	10	-	-	1	-	-	-	-	1	-	1	2	1	-	-	1	3	21	2	-	-	-	-	4	2
2014	62	-	-	-	5	3	-	1	-	7	-	1	8	-	-	-	-	-	2	5	-	4	3	9	6	1	-	2	1	18	-	-	-	-	-	5	3
Total	1237	20	-	6	71	39	2	1	1	155	13	26	184	11	3	2	1	6	21	104	29	200	35	317	111	12	1	9	73	129	18	12	21	7	1	150	92

Fiscal Quarter	obs	ada	invest_fv	loan_loss_res	acq_and_reorg	aro	prepaids	consol	debt_eq	exec_comp	depr_method	ppe_salv_val	ppe_life	exps	derivs	interco	inv_lcm	inv_eo	inv_cost	commits	ins_ibnr	restruct	warranty	accruals	other	pension	ppe_impair	int_gw_impair	rev_rec	rev_contract	rev_giftcard	rev_licensing	rev_retmall	rev_rebates	sec_comment	options	tax
Income Increasing Changes in Estimates																																					
First	192	2	-	3	11	1	-	-	-	24	4	9	32	5	1	-	-	1	1	10	8	39	9	63	10	1	-	2	10	17	1	2	-	-	1	24	11
Second	138	4	-	-	8	-	-	-	-	15	-	2	15	1	-	-	-	2	4	18	7	22	5	38	18	2	-	-	9	13	5	2	3	1	-	14	11
Third	134	1	-	-	8	2	1	-	-	25	2	-	8	3	-	-	-	-	3	8	3	19	1	32	9	1	-	-	12	12	2	1	5	3	-	25	18
Fourth	192	7	-	1	16	3	-	-	-	19	-	7	14	1	1	-	-	-	-	21	7	38	8	59	21	3	-	-	15	8	5	1	2	1	-	17	26
Income Decreasing Changes in Estimates																																					
First	139	1	-	1	3	9	-	-	-	33	3	1	31	1	1	1	-	-	-	7	-	22	4	35	8	-	-	1	3	11	-	1	1	-	-	33	4
Second	120	1	-	-	9	4	1	-	1	15	1	2	18	-	-	-	-	1	4	15	1	17	1	24	18	3	-	1	5	16	3	1	4	-	-	15	4
Third	101	-	-	1	7	3	-	1	-	9	2	3	13	-	-	1	-	1	2	12	-	12	3	18	14	-	1	3	6	15	1	2	2	2	-	8	7
Fourth	221	4	-	-	9	17	-	-	-	15	1	2	53	-	-	-	1	1	7	13	3	31	4	48	13	2	-	2	13	37	1	2	4	-	-	14	11
Total	1237	20	-	6	71	39	2	1	1	155	13	26	184	11	3	2	1	6	21	104	29	200	35	317	111	12	1	9	73	129	18	12	21	7	1	150	92

APPENDIX C

IDENTIFYING ESTIMATE RESTATEMENTS

The tables below show the links between change in estimate categories and restatement categories. Category titles are taken from Audit Analytics Changes in Estimates and Restatements databases. The linking of estimate categories to restatement categories is used to develop an alternative control group for testing the determinants of reporting a change in estimate. This alternative control group contains all firm-year observations that were subsequently restated for one of the below titles. These restatements therefore pertain to estimate accounts which, had the information been known by managers at the time, should have been originally disclosed as changes in estimates.

Change in Estimate and Restatement Link

Change in Estimate Description	**Corresponding Restatement Description**
Accounts/loans receivable & cash issues; allowance for doubtful accounts; fair value and valuation of investment securities (AR); loans receivable valuation and loss reserve	Accounts/loans receivable, investments & cash issues
Acquisitions (esp. purchase price adj.), mergers, disposals, re-organizations	Acquisitions, mergers, disposals, re-org acct issues
Asset retirement obligations	Asset retirement issues
Capitalization of expenditures issues – prepaid assets, other assets, etc.	Capitalization of expenditures issues
Consolidation, foreign currency/inflation, etc.	Consolidation issues incl Fin 46 variable interest & off-B/S; Consolidation, foreign currency/inflation (subcategory) issue

Change in Estimate Description	Corresponding Restatement Description
Debt, quasi-debt, warrants & equity (BCF) security	Debt and/or equity classification issues; Debt, quasi-debt, warrants & equity (BCF) security issues
Deferred, stock-based and/or executive comp	Deferred, stock-based and/or executive comp issues; Deferred, stock-based options backdating only (subcategory); Deferred, stock-based SFAS 123 only (subcategory)
Depreciation, depletion or amortization; change in depreciation or amortization method; change in estimated salvage value; change in estimated useful life	Depreciation, depletion or amortization errors
Expenses (payroll, SGA, other)	Expense (payroll, SGA, other) recording issues
Financial derivatives/hedging	Financial derivatives/hedging (FAS 133) acct issues
Intercompany, investment in subs./affiliate, etc.	Foreign, related party, affiliated, or subsidiary issues; Foreign, subsidiary only issues (subcategory); Intercompany, investment in subs./affiliate issues; Intercompany, only, (subcategory) - accounting issues
Inventory - lower of cost or market; reserve for obsolete and slow moving inventory; Inventory, vendor and/or cost of sales	Inventory, vendor and/or cost of sales issues
Lease, legal, contingencies, commitments etc.	Lease, SFAS 5, legal, contingency and commitment issues; Lease, leasehold and FAS 13 (98) only (subcategory)
Liabilities - insurance loss reserve including IBNR; restructuring reserve; warranty reserves; Liabilities, accruals or reserves	Liabilities, payables, reserves and accrual estimate failures
Pension and other post-retirement benefit; Pensions - discount rate selection	Pension and other post-retirement benefit issues
PPE & Intangible assets; valuation or impairment of fixed assets	PPE intangible or fixed asset (value/diminution) issues
PPE & Intangible assets - valuation or impairment of intangible assets and goodwill only	PPE issues - Intangible assets, goodwill only (subcategory)

Change in Estimate Description	Corresponding Restatement Description
Revenue recognition; contract accounting including percentage-of-completion; gift cards and aircraft miles breakage; milestone payments and licensing fees; sales returns and allowances; vendors rebates and allowances	Revenue recognition issues; Gain or loss recognition issues
Tax expense/benefit/deferral/other, inc. valuation allowance	Tax - FIN 48 Additional Paid-In Capital Affected; FIN 48 Deferred Tax Assets Affected; FIN 48 Deferred Tax Liability Affected; FIN 48 Estimate Only of F/S Effect Provided; FIN 48 Liabilities for Interest and Penalties Affected; FIN 48 Liabilities For Taxes Payable Affected; FIN 48 Misc.Account Affected; FIN 48 Reclass among BS accounts noted; FIN 48 Reserve For Uncertain Tax Position Affected; FIN 48 Retained Earnings Cumulative Adjustment; FIN 48 Statutory Tax Periods Noted; FIN 48 Tax Asset Valuation Allowance Affected; FIN 48 Tax Receivables Affected; FIN 48 Unaffected or Unidentified Affects; FIN 48 Uncertain Tax Position Liability; FIN 48 Unrecognized Tax Benefit Liability Affected; Tax expense/benefit/deferral/other (FAS 109) issues
Other accounting estimates	GAAP - Changes in Acct Principles FASB/EITF or Foreign GAAP; SAB 108 Change in Accounting Policy; SAB 108 Change in Estimate; SAB 108 Miscellaneous Adjustments; SAB 108 reversals of previous restated amounts

Omitted Restatement Categories

Balance sheet classification of assets issues
Cash flow statement (SFAS 95) classification errors
Comprehensive income issues
EPS, ratio and classification of income statement issues

Fin Statement, footnote & segment disclosure issues
Proforma financial information reporting issues
Restatements made while in bankruptcy/receivership
Retrospective revisions to p/y financials for consistency
Unspecified (amounts or accounts) restatement adjustments
Audit or auditor related restatements or nonreliance
Audit(or) - adj not booked by Co (subcategory)
Audit(or) - defective acct records (subcategory)
Audit(or) consent re opinion in f/s issues (subcategory)
Audit(or) inability to rely on Co reps (subcategory)
Audit(or) Independence/PCAOB reg issues (subcategory)
Capital adequacy and calculation issues
Loan covenant violations/issues
Registration/security (incl debt) issuance issues
Material Weakness - Section 404 or 302 issues identified

Estimate Categories with no Corresponding Restatement Category

SEC comment letter disclosure
Stock-based compensation - forfeiture rate, vesting, and valuation estimates

Examples of Estimate Disclosures

The following demonstrates different disclosure for a revision of the same asset from two separate firms. Both firms revised the information set applicable to deferred tax assets, however one firm disclosed it as a change in estimate and the other firm disclosed it subsequently as a restatement. The key difference in these is the determination of when information became available.

Change in Estimate – From Aaon, Inc. 2013 annual report

> "The Company also had a change in estimate related to the recoverability of certain 2012 tax credits that was recorded in the first quarter of 2013 for approximately $0.6 million. This change in estimate was the result of additional

and better information. Had the ATRA impact and the change in estimate been booked in 2012 instead of 2013, our overall effective tax rate would have been approximately 35.5% for the year ended December 31, 2012."

Restatement – From Radnet, Inc. 2013 annual report regarding 2012 information:

"In November 2013, during a review of the Company's work papers supporting its deferred tax assets, management discovered an error in the historical tax treatment of certain mark-to-market adjustments recorded in relation to its interest rate swaps, dating back as far as 2009. This error caused the Company's deferred tax assets to be overstated by approximately $4.3 million and unrecognized tax benefit liability (included in accounts payable, accrued expenses and other) to be understated by approximately $0.4 million at December 31, 2012."

Both disclosures indicate information existed regarding elements within the deferred tax asset valuation. Radnet's disclosure suggests management was unaware of this information until the subsequent year, and therefore the firm restated.

The intended purpose of assessing the determinants of a change in accounting estimate relative to a subsequent restatement of estimates is to ascertain what characteristics of either the firm or the auditor lead to new information becoming incorporated into valuation assumptions in the period of origination of the information.